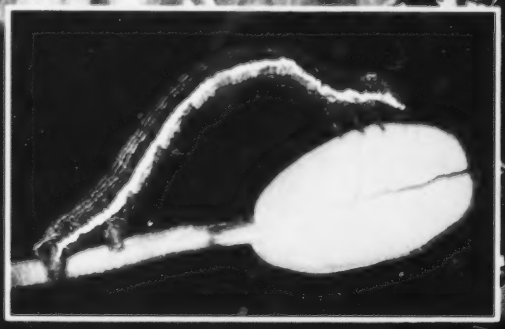
Cranberry Pests of Quebec

AN IDENTIFICATION GUIDE



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Introduction

Cranberry production in Quebec has increased steadily in recent years. The development of a guide for the identification and scouting of the major pests of cranberry is therefore an essential step in helping growers and plant health stakeholders in the implementation of integrated pest management programs.

This guide describes the 38 species of pest associated with cranberry production in Quebec and outlines the key aspects of their biology and the symptoms of the damage they cause.

Some of the information presented in this guide is based on the results of a study conducted in 1998 and 1999 in Bois-Francs, the main cranberry producing region of Quebec, and on scouting data gathered by the Club d'encadrement technique Atocas Québec since 1995. The data was used to identify the species of insects present in commercial bogs, to determine their status as pests and to describe their phenology.

The guide's practical, pocket-book format and many colour photographs make it a highly accessible diagnostic tool for users.

Classification of pests

This guide is designed to help users identify major cranberry insect pests. The insects are classified according to the extent of the damage they cause in cranberry bogs.

Primary pests
Insects that have the potential to cause significant economic damage if not controlled. These insects are well adapted to cranberry bogs. Most feed primarily on plants of the genus *Vaccinium*.

Secondary pests
Insects that cause economic damage in some years. They are pests that should be monitored if no intervention is taken to control the primary pests. They are regularly observed in cranberry bogs, but numbers are typically small. Most are polyphagous.

Minor pests
Insects that rarely cause economic damage. They are occasionally observed in bogs and their populations are small.

Occasional pests
Insects that feed on cranberry plants, but do not cause economic damage. Their presence in cranberry bogs is sporadic.

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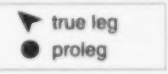
Host plants

All insect pests mentioned in this guide were sampled in commercial cranberry bogs in the region of Bois-Francs, Quebec. The larvae collected were laboratory reared on cultivated cranberry plants (varieties of *Vaccinium macrocarpon*). Only those species that completed their development to the adult stage on the cranberry plants are included in this guide. The section "Host Plants" lists the species of plants mentioned in the specialized literature (see Bibliography). The mention "cranberry" alone refers to cultivars of *Vaccinium macrocarpon*. The references to *Vaccinium oxycoccos* were taken from the specialized literature. The mention "*Vaccinium* (cranberry and blueberry)" indicates cultivars of cranberry and unspecified species of blueberry.

Types of caterpillar

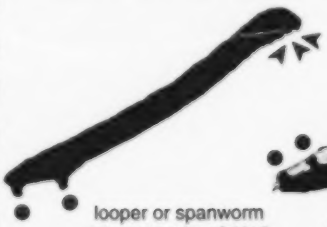
Although there are many types of caterpillars, those briefly described below comprise the species inventoried in cranberry bogs in Quebec.



Loopers and spanworms (Lepidoptera: Geometridae)

- 2 pairs of abdominal prolegs throughout the larval stage (exceptionally 3 pairs in some species, e.g., fringed looper); the first pair is located on the 6th abdominal segment, the other on the 10th (last) segment;
- body hairless or, rarely, with sparse stiff hairs;
- move with a characteristic looping motion by arching the middle section of the body;
- when disturbed, stiffen on their abdominal prolegs, resembling a twig;
- moths for the most part nocturnal.

looper or spanworm
(walking: 2 pairs of prolegs)



looper or spanworm
(at rest; true legs folded)

looper or spanworm
(at rest, with anchoring silk strand)

For scouting purposes, loopers and spanworms are divided into three categories:

Small loopers and spanworms: Green Spanworm and Rannock Looper. Individually, small loopers and spanworms are not highly voracious. However, when populations are large, they can cause significant damage. At maturity, they do not exceed 30 mm in length.

Large loopers and spanworms: Big Cranberry Spanworm, Stout Spanworm, Spiny Looper, Cleft-headed Looper. Individually, these loopers and spanworms are very voracious. At maturity, they reach up to 60 mm in length.

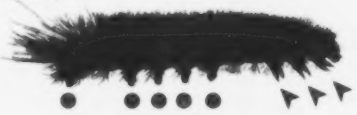
Other loopers and spanworms: Black Spanworm, Chain-spotted Geometer, Triangle marked, Small Engrailed, Hemlock Looper and Horned Spanworm.

Noctuid moths and cutworms (Lepidoptera: Noctuidae)

- 5 pairs of abdominal prolegs (on abdominal segments 3 to 6 and 10), except in 1st and sometimes 2nd instar; in very young caterpillars, the first two pairs of abdominal prolegs are very undeveloped and the caterpillar moves like a looper; this behaviour disappears quickly in subsequent instars;

cutworm (noctuid)
(5 pairs of prolegs)

- length up to 60 mm at maturity;
- some noctuid moth caterpillars are hairy; dagger moth caterpillars of various species, for instance, are diverse in both habit and form, ranging from hairless caterpillars to caterpillars with long "fur" and including caterpillars with dense clusters or tufts of hair;

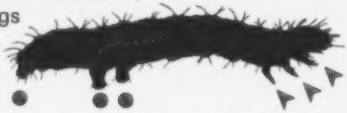


cutworm (noctuid)
(5 pairs of prolegs)

- young caterpillars are active day and night; at subsequent stages, they are active only at night and hide under plants during the day.

False loopers (Lepidoptera: Noctuidae)

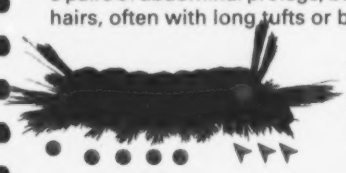
- 3 pairs of abdominal prolegs throughout their larval life (the first two on the 5th and 6th abdominal segments);
- move like other noctuid moths;
- body hairless or with sparse setae;



false looper (noctuid)
(3 pairs of prolegs)

Tussock moths (Lepidoptera: Lymantriidae and Arctiidae)

- 5 pairs of abdominal prolegs; body with dense, brightly coloured hairs, often with long tufts or brushes;



lymantriid and arctiid
(5 pairs of prolegs,
here concealed by hairs)

arctiid
(5 pairs of prolegs,
here concealed by hairs)

Sawflies (Hymenoptera: Tenthredinidae)

- Larvae have 6-7 pairs of abdominal prolegs, the 1st located on the 2nd abdominal segment; body hairless;
- sawfly larvae can be confused with young noctuid moth caterpillars; they can be distinguished by their 6-7 pairs of abdominal prolegs (5 or fewer in noctuid moths);
- they feed primarily on weeds and small trees (birches, willows, etc.);
- adults have 4 transparent wings and black, yellow or dull red coloration;
- sawflies are often observed in plantations; those that feed on cranberries do not cause significant economic damage.

sawfly (Hymenoptera)
(6-7 pairs of prolegs)

Cautionary note

Several groups of insects contain a large number of very similar species. The most common cranberry pests include species in the cutworm or noctuid moth family (Noctuidae; over 760 species in Quebec), leafrollers (Tortricidae; over 450 species), loopers and spanworms (Geometridae; over 300 species), and weevils and snout beetles (Curculionidae; 280 species). Many of these insects occur in a variety of habitats or feed on plants that grow around cranberry bogs, such that their presence in cranberry bogs does not necessarily mean that they live there. Caution must therefore be exercised when identifying species, since insects that superficially resemble the pests described in this guide can quite often be found in cranberry bogs, where there presence is accidental. Many loopers, spanworms and noctuid moths use a wide variety of host plants and habitats and although they will attack cranberries, they can also develop on other plants.

The identification of very young caterpillars is always difficult and often involves some uncertainty, even for a specialist. The characters that distinguish a species, and sometimes even an entire family, are often absent in very young caterpillars and appear only during the development of subsequent larval stages. Caution must therefore be exercised in identifying very small or young caterpillars. Where there is any uncertainty, a specialist should be consulted.

Nomenclature

Specialists assign a "scientific" name, which is always in Latin, to each living species. Each name is composed of two words: the first represents the genus (group of species with common characteristics), the second the species. The name of the species may be followed by the name of its author. In theory, the scientific name of a species must be unique. When it is discovered that a species has been described under two different Latin names (in different regions, at different times, for different forms that were erroneously believed to represent different species, etc.), the names are synonymized and the older of the two is given priority. The same principle applies to the names of genera. That is why scientific names change. For example, until quite recently, loopers and spanworms in the genus *Macaria* were called *Itame*.

The assignment of scientific names is governed by a very precise code. For example, the scientific names of animals are governed by the International Code of Zoological Nomenclature, which is established and periodically revised by the International Commission on Zoological Nomenclature, composed of scientists working in the field of systematics (branch of biology that names, describes, catalogues and classifies organisms). To be recognized by the scientific community, the scientific names must be assigned in accordance with the rules of the Code.

In contrast, the common, or vernacular, names vary from language to language and often from region to region. One species often has several names in a given language. For example, *Rhopobota naevana* is called Holly Tortrix or Holly Leaf Tier in Europe, and Black-headed Fireworm in the United States. Sometimes, the larva and adult of a given species even have different names. For example, in English the caterpillar of *Amphipyra pyramidoides* is called Rear-humped Caterpillar whereas the moth is called Copper Underwing. There is no code governing vernacular names and all species do not necessarily have a common name. Species that are given a common name usually have an economic or societal impact.

Identification key

An identification key provides a structured approach that gradually leads the user to the species to be identified through a successive series of steps highlighting the characteristics of the organisms studied. It offers choices between different or conflicting characters, beginning with the most general and followed by increasingly specific characters, until each species treated is isolated.

The key is presented in the following pages as a series of six tables that provide a hierarchy of choices. The choices are separated by spaces. The tables are read from top to bottom beginning on the left. The choices presented at a given level are compared. When the relevant choice is made for the first block, the reader moves to the following right-hand block, once again reading the choices of the second level from top to bottom, continuing until he finds the answer, which is found in the far right column. Table 1 is the starting point.

Larvae or caterpillars that are too small or too agitated to be identified in the field must be collected and examined in the "laboratory" once they have been immobilized. To do so, they can be dropped in a small amount of very hot water (almost boiling) and left for a few minutes. This operation will kill them instantly and the body will become somewhat distended, which will facilitate microscopic examination. A small 5-10x hand lens is sufficient to examine small caterpillars. Nonetheless, it is often impossible to identify very young caterpillars with certainty (see "Cautionary note", p. 6).

Table 1

larva (caterpillar, maggot, or "worm")	3 pairs of true legs and 2-5 pairs of prolegs; body hairy or not		Table 2
	3 pairs of true legs and 6-7 pairs of prolegs; body devoid of hairs		Cranberry Sawfly (p. 100)
	3 pairs of true legs, no prolegs (body with fine sparse hairs)		Red-headed Flea Beetle (p. 45)
	without legs nor hairs	head visible	Cranberry Weevil (p. 55)
		head concealed	Cranberry Tipworm (p. 26)
adult (moth, beetle, or fly)	tiny fly,1,5 mm, 2 wings		Cranberry Tipworm (p. 28)
	small wasp, 4-6 mm, 4 wings		Cranberry Sawfly (p. 100)
	beetle	black, slender, 4-5 mm head normal-looking	Red-headed Flea Beetle (p. 45)
		brown or rusty with white markings, chunky, 1,5-2 mm, head with a long "beak"	Cranberry Weevil (p. 55)
	moth or butterfly		not in the identification tables

Table 1

larva (caterpillar, maggot, or "worm")	3 pairs of true legs and 2-5 pairs of prolegs; body hairy or not		Table 2
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	moth or butterfly		not in the identification tables

Table 2

5 pairs of prolegs	caterpillar living in the soil and feeding on roots and buried stems		Cranberry Girdler (p. 19)
	caterpillar on foliage or on the flowers	makes webbing or extensive silk tying together parts of the plant where it feeds; usually concealed	[illegible]
		does not make webbing; exposed	Table 5
	caterpillar in the fruits	head brown; back unmarked; antennae (very short) entirely yellow	Cranberry Fruitworm (p. 34)
		head yellow or light reddish brown; back with several pairs of white dots; tips of antennae black	Sparganothis Fruitworm (p. 64)
3 pairs of prolegs	green with 1 distinct white lateral line and scattered black setae		Putnam's False Looper (p. 90)
	green with 1 white lateral line, 3 dorsal white lines and dorsal white dots; without setae		False Amryworm (very young) (p. 31)
	grey with ventral fringe of short and dense hairs		Fringed Looper (p. 98)
2 pairs of prolegs			Table 3

Table 3

body with short and sparse, but distinct hairs	grey with small yellow, orange, and black spots		Spiny Looper (p. 50)
	black with yellow and white stripes		Black Spanworm (p. 22)
body without distinct hairs	head with 2 triangular projections		Cleft-headed Looper (p. 82)
	back with 2 pairs of extensible tentacles		Horned Spanworm (p. 71)
	back with 2 small humps at 2/3 of length (body grey)		Big Cranberry Spanworm (p. 48)
	head and back without any outstanding structure	green with 1 white lateral stripe	Green Spanworm (p. 25)
		more or less uniformly dark brown or black	head rusty contrasting with blackish body — Triangle-marked (young) (p. 73)
			head the same colour as the body — Big Cranberry Spanworm (young) (p. 48)

(continued on next page)

Table 2

5 pairs of prolegs	caterpillar living in the soil and feeding on roots and buried stems			Cranberry Girdler (p. 19)
	caterpillar on foliage or on the flowers	makes webbing or extensive silk tying together parts of the plant where it feeds; usually concealed	head black	Black-headed Fireworm (p. 37)
			head yellow or reddish	Sparganothis Fruitworm (p. 64)
		does not make webbing; exposed		Table 5
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		more or less uniformly dark brown or black; head rusty contrasting with blackish body	Triangle-marked (young) (p. 73)
		more or less uniformly dark brown or black; head the same colour as the body	Big Cranberry Spanworm (young) (p. 48)

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Table 3 (continued)

body without distinct hairs	head and back without any outstanding structure	blackish with yellow or white dots or rings		Stout Spanworm (young) (p. 53)
		with pattern of black, yellow, and white lines		Chain-spotted Geometer (p. 80)
		mottled with stretched marks on the sides	head black or white	Hemlock Looper (p. 84)
			head rusty	Rannock Looper (p. 78)
		grey with rectangular rusty marks on the back		Johnson Spanworm (p. 96)
		grey, brown, or greenish with pattern of fine dots, spots, or thin lines		Table 4

Table 4

pale grey or lavender with yellow spots and thin yellow or salmon lines; head reddish spotted with black	Stout Spanworm (p. 53)
grey-green with a lateral white stripe; head and legs black	Chain-spotted Geometer (very young) (p. 80)
brown with an oblique pale yellow mark above the 1st pair of prolegs	Small Engrailed (young) (p. 75)
brownish with ill-defined marks and a dark, V-shaped mark on the middle of the back	Small Engrailed (p. 75)
grey-brown or brown, side with 5 black marks, the 1st larger and preceded by a white mark; head rusty	Triangle-marked (p. 73)

Table 5

body covered with long and dense hairs, forming 4 thick clumps on the back and slender, black brushes at both ends	2 lateral, long, black brushes and many small red warts on the sides	Rusty Tussock Moth (p. 58)
	without lateral brushes and with few or no red warts on the sides	White-marked Tussock Moth (p. 98)
body covered with evenly distributed hairs (if hairs are slightly clumped, then clumps not dense; no brushes)	back with 5 pairs of blue warts and 6 pairs of red warts	Gypsy Moth (p. 92)
	back with 11 pairs of blue warts	Gypsy Moth (very young) (p. 92)
	back with only 2 red warts toward the end of the abdomen	Tussock Moths (very young) (p. 58)
	back with black warts; back and sides with orange or yellow stripes	Impressed Dagger Moth (p. 69)
	back with yellow or black warts and a white or pale yellow median line	Fall Webworm (p. 100)
	back with reddish or black warts, without pale median line	Saltmarsh Caterpillar (p. 100)
body velvety from very short and dense hairs		Bog Copper (p. 88)
without distinct hairs		Table 6

Table 6

back green, often with small pale dots	posterior end with a large, prominent spine; spiracles red; underside black		Graceful Clearwing (p. 100)
	posterior end strongly humped; spiracles black circled with white; side with a yellow stripe		Rear-humped Caterpillar (p. 95)
	posterior end slightly humped; body yellowish green with a white stripe on the back and another one on the side		Rear-humped Caterpillar (very young) (p. 95)
	posterior end normally rounded	head green with or without dark brown speckles; side with a thick white stripe; back with pairs of white dots	False Armyworm (p. 31)
		head green-yellow with rusty speckles; body with numerous small white dots and sides with 2 fine white lines	Speckled Green Fruitworm (young) (p. 61)
		head green without speckles or with white speckles; body apple green or blue green with numerous fine, pale yellow or white speckles; sides with 1 fine white line	Speckled Green Fruitworm (p. 61)

(continued on next page)

Table 5

body covered with long and dense hairs, forming 4 thick clumps on the back and slender, black brushes at both ends	2 lateral, long, black brushes and many small red warts on the sides	Rusty Tussock Moth (p. 58)
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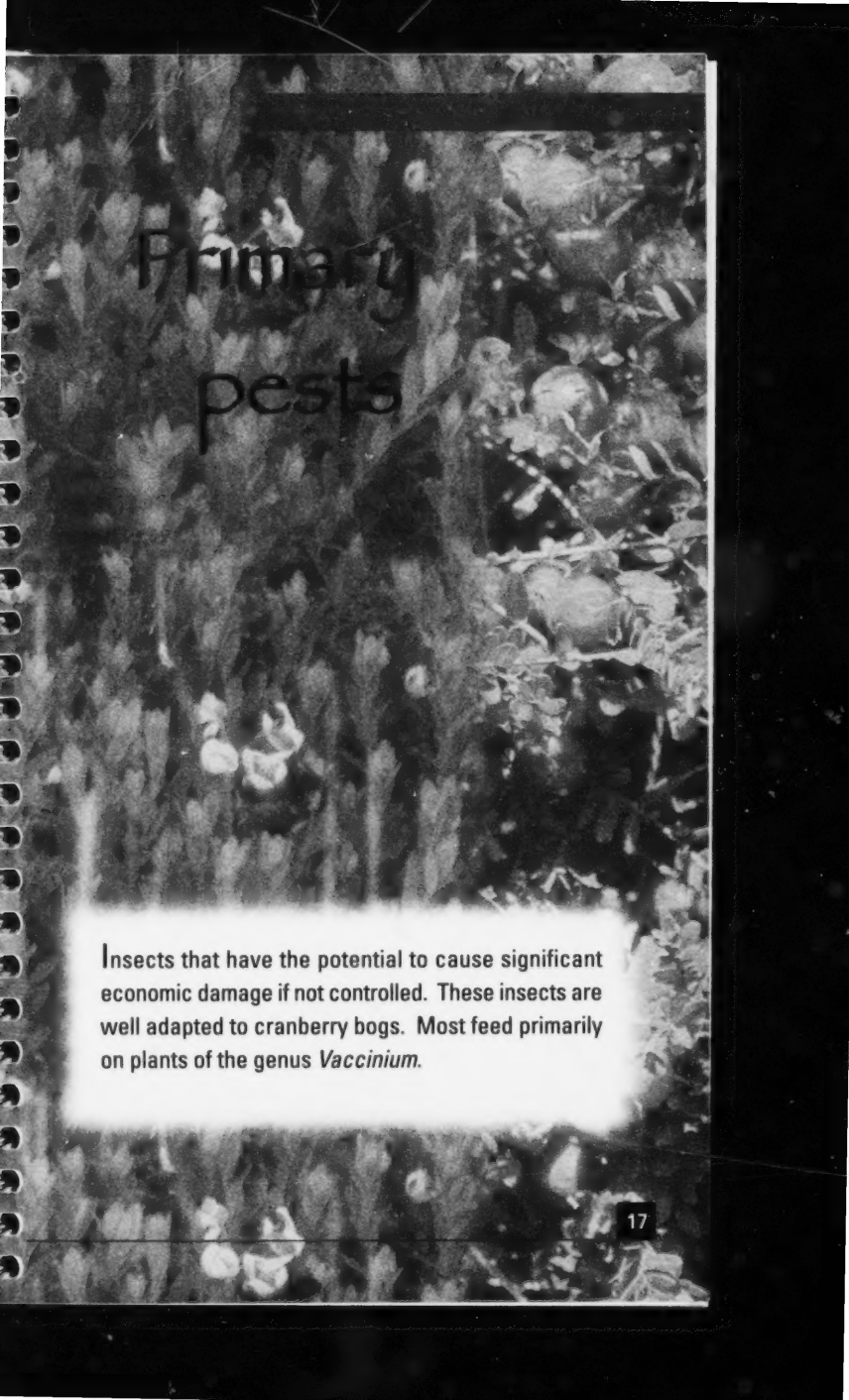
		head green without speckles or with white speckles; body apple green or blue green with numerous fine, pale yellow or white speckles; sides with 1 fine white line	Speckled Green Fruitworm (p. 61)

(continued on next page)

Table 6 (continued)

back velvety black with white dots		False Armyworm (fully grown) (p. 31)
back and sides with broad yellow and black stripes, the black stripes cross-hatched with thin white lines		Zebra Caterpillar (p. 86)
back brownish red with 3 pairs of large, crescent-shaped, crimson marks; side with a broad crimson stripe		Chevron-marked Caterpillar (p. 98)
back evenly rusty or brownish red with 3 very thin pale lines; side with a broad white stripe	the 6 middle black spiracles situated just above the white lateral stripe (see fig. on p. 41)	Cranberry Blossomworm (p. 40)
	the 6 middle black spiracles situated right on the white lateral stripe (see fig. on p. 41)	Subdued Quaker (p. 100)



Primary pests

Insects that have the potential to cause significant economic damage if not controlled. These insects are well adapted to cranberry bogs. Most feed primarily on plants of the genus *Vaccinium*.

Cranberry Girdler

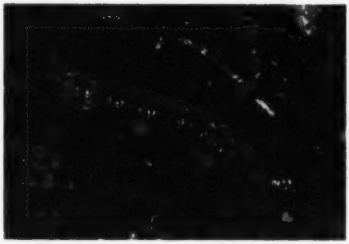
Anneleur de la canneberge
Chrysoteuchia topiaria (Zeller)
(Lepidoptera: Pyralidae)

The Cranberry Girdler is not widely distributed in cranberry plantations in Quebec. However, it is abundant in British Columbia and the United States, and occurs throughout North America and Europe. It attacks the roots of many plants, including those of lawn grasses and young plantation conifers.

Egg

- white at oviposition, becoming reddish just before hatching;
- oval, ends slightly flattened, ribbed surface; diameter 0.4 mm.

Caterpillar

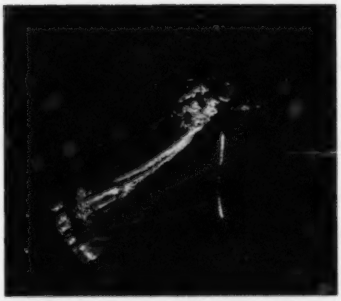


- typical caterpillar, 5 pairs of abdominal prolegs;
- young caterpillar whitish, covered with very fine hairs, or setae;
- small, very difficult to detect because it stays on the ground among plant debris;
- mature caterpillar yellowish white or grey-white with dirty grey spots on the back; sides of the body with long golden setae; head reddish-brown;
- length at maturity 16 mm.

Pupa

- light yellow;
- enclosed in a cocoon made of a mixture of materials from the soil tied with silk;
- length 10 mm.

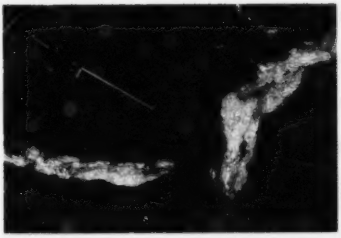
Adult



- moth at rest with wings folded around the body, giving it the appearance of an elongated tent, with a protruding "snout";
- whitish appearance in flight;
- upperside of forewings ranging from yellowish white to olive brown, with fine brown, yellow and silver lines; margins with a few small black dots and silver transverse lines;
- hindwings uniformly grey brown, fringed;
- length 9-13 mm; wingspan 15-20 mm.

Biology

- one generation per year;
- overwinter as mature caterpillars in the cocoon in soil debris;
- in spring, the pupae complete their development;
- the adults begin to emerge in late June and are present until August;
- the females lay their eggs in plant debris in July and August;
- the eggs hatch 1-2 weeks after oviposition;
- caterpillars are present from August to September;
- the caterpillars feed on branches, runners and sometimes even the roots, chewing through the bark and wood.



Hosts

Cranberry (*Vaccinium macrocarpon*), various lawn grasses (e.g., fescue, timothy, etc.), conifers, sheep sorrel and dock (*Rumex, Polygonaceae*).

Symptoms

Damage is caused by the caterpillars. The affected plants turn red and then brown. The symptoms are not highly visible until the fall or following spring. The presence of excrement in strands of silk near damaged stalks can be seen.

Black Spanworm

Arpenteuse noire
Macaria argillacearia (Packard)
(Lepidoptera: Geometridae)

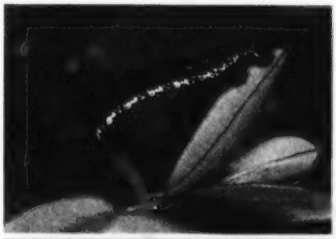
In Quebec, the Black Spanworm can cause significant damage in the spring. This indigenous species is not widely distributed in plantations. Its range is limited to northeastern North America. Until recently, its scientific name was *Itame argillacearia.*

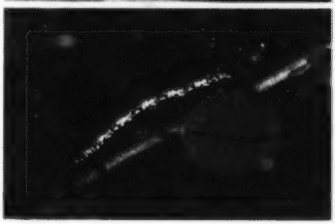
Egg

- elongate oval, approximately 0.65 x 0.45 mm;
- surface covered with small tubercles arranged in polygonal groups.

Caterpillar

- typical spanworm with 2 pairs of abdominal prolegs;
- ground colour black;
- sides with a yellow band with black dots and white spots;
- back with fine white lines;
- head with light grey spots on the top and sides;
- young caterpillar covered with erect black hairs; hairs of mature caterpillar very short;
- length 20 mm at maturity.





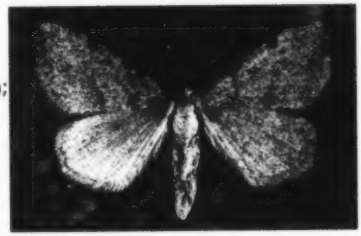
Pupa

- dark brown, in the soil.

Adult

- Male, ground colour grey; wings immaculate, slate grey, tips with dark margins; antennae pectinate;
- Female, ground colour beige; forewings with some brown spots on the margin, sometimes centre with a short transverse brown band reaching the posterior margin; antennae filiform;
- wing span: male 25-27 mm; female 18-21 mm.

Male



Female

Biology

- one generation per year;
- overwinter as eggs;
- eggs hatch in early May;
- caterpillars present in May and early June;
- feed primarily on buds;
- the caterpillars develop very rapidly;
- emergence of adults in June;
- the females do not fly because their wings are too small to support their weight;
- eggs laid in plant debris.

Hosts

Cranberry (*Vaccinium macrocarpon*). The literature also mentions blueberry but this could not be confirmed.

Symptoms

Damage is caused by the caterpillars. The young caterpillars burrow into the buds and eat the inner part. The more mature caterpillars destroy the buds. At the flowering stage, damaged areas can be distinguished by their darker appearance, which is due to the absence of new buds.

Green Spanworm

Arpenteuse verte
Macaria sulphurea (Packard)
(Lepidoptera: Geometridae)

In Quebec, the Green Spanworm is a major pest of cranberry before flowering. This indigenous species occurs in all cranberry producing regions of Eastern North America, but is absent west of the Rockies. Until recently, this species was known by the name *Itame sulphurea.*

Egg

- pale green, oval, slightly flat; approximately 0.7 mm in diameter.

Caterpillar

- looper caterpillar with 2 pairs of abdominal prolegs;
- green with fine white longitudinal lines on the back and a whitish band on the side;
- length at maturity 25 mm;
- can be confused with young caterpillars of the False Armyworm and Putnam's False Looper, both green with a white lateral line. However, the latter two have 3 pairs of abdominal prolegs (5 in the mature False Armyworm caterpillar) and long black setae on their body which are clearly visible under the magnifying lens. The Green Spanworm has only 2 pairs of abdominal prolegs and very short, light, indistinct setae.

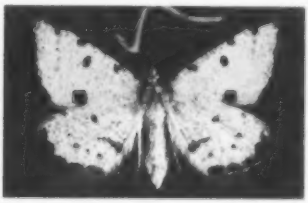
Pupa

- brown, buried in the soil;
- approximately 10 mm in length.

Adult

- coloration of male and female moths very different;
- male with grey-brown or beige forewings with olive brown flecks and spots; hind wings light beige with the margin contrasting little with the rest of the wing; antennae pectinate; wingspan 21-27 mm;
- female with yellow forewings with a brown margin and a few brown spots; hindwings light beige with yellow tint, and brown margin contrasting dramatically with the centre of the wing; antennae filiform; wingspan 18-23 mm;
- the females can be easily distinguished from all other species present in cranberries;
- the males are very similar to the males of the Black Spanworm, from which they can be distinguished by the well-defined dark flecks and spots.

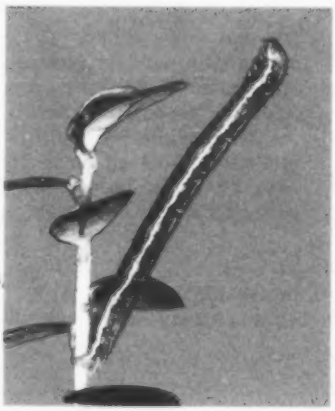
Male



Female

Biology

- one generation a year;
- overwinter as eggs;
- the eggs hatch from mid-May to June;
- the caterpillars are among the first to be observed in the fields in spring (along with those of the Black Spanworm);
- they feed on terminal buds, new leaves and flower buds;
- when disturbed, they sit up on their hind legs and stiffen, resembling a twig;
- the larval development period continues until flowering;



- at maturity, the caterpillars migrate into plant debris to pupate, which starts in mid-June;
- the adults emerge in early July and are active until August;
- the males are more active than the females;
- the females lay their eggs usually singly, although sometimes in small clusters, in August in plant debris.

Host

Vaccinium, including cranberry; also sweet gale (Myricaceae).

Symptoms

The damaging stage is the caterpillar or larval stage. The spanworms eat all or part of the buds that break out. As the plants develop, they feed on new leaves and flower buds, sometimes leaving only old foliage. The damaged areas appear darker during flowering. The caterpillars are less numerous in young fields since they are sanded annually. A large population of adults may presage an infestation the following year.

Cranberry Tipworm

Cécidomyie des atocas
Dasineura oxycoccana (Johnson)
(Diptera: Cecidomyiidae)

The Cranberry Tipworm is common in cranberry bogs in Quebec and in most U.S. states. Although it is considered a major pest, relatively little is known about its economic impact. This indigenous species occurs primarily in northeastern North America and in Wisconsin. It is reported occasionally on the Pacific Coast.

Egg

- translucent with sparse red pigmentation, smooth surface;
- elongate and slightly curved, approximately 0.35 mm in diameter.

Larva

- a maggot without legs, length 1.5-2.0 mm at maturity;
- three separate larval stages distinguishable by their coloration:
  1st instar: light yellow, translucent larvae;
  2nd instar: pearl white larvae;
  3rd instar: orange larvae just before pupation.

1st instar

2nd instar

3rd instar

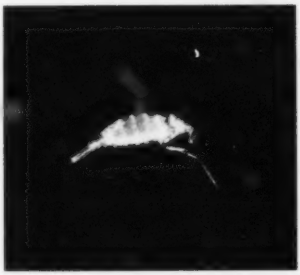
Pupa

- brown, approximately 2 mm in length;
- enclosed in very fine white silk cocoon constructed in cupped leaves resulting from feeding by the larvae.

Adult

- resembles a minuscule mosquito with long, fine legs, antennae ciliate and two transparent wings;
- male brown with rounded end of abdomen;
- female reddish with swollen abdomen with pointed end;
- length approximately 1.5 mm.

Male



Female

Biology

- in Quebec, generally three generations a year;
- overwinter as pupae in the leaf litter;
- in May, first generation adults emerge and mate;
- oviposition begins in late May;
- the females lay their eggs singly on new leaves at the apex of stems;
- they deposit 1-5 eggs per stem, at the surface near the base of terminal leaves;
- the larvae feed by rasping the upper surface of the leaves;
- the complete cycle from egg to adult takes 2-4 weeks.

Hosts

Cranberry (*Vaccinium macrocarpon* and *V. oxycoccos*).

Symptoms

The damage is caused by the larvae to the tips of new shoots. The larvae break the point of growth of the stem, forcing the plant to produce lateral stalks. The damaged leaves become cupped and lose their colour. The leaves then turn brown and drop off. Early in the season, the plants recover well from damage. In August, the larvae of the last generation damage developing buds, resulting in yield losses.

False Armyworm

Fausse légionnaire
Xylena nupera (Lintner)
(Lepidoptera: Noctuidae)

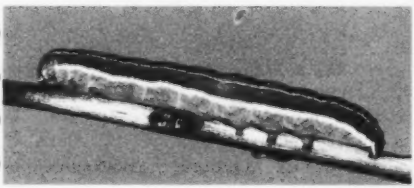
The False Armyworm is an indigenous species occurring throughout most of North America. It is the most abundant noctuid moth in cranberry plantations in Quebec.

Egg

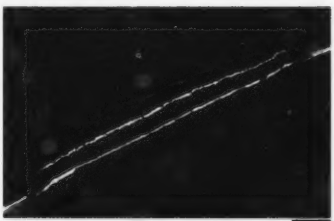
- pale yellow when first laid, turning reddish brown before hatching;
- in the shape of a convex disk or bun-shaped; diameter approximately 0.8 mm.

Caterpillar

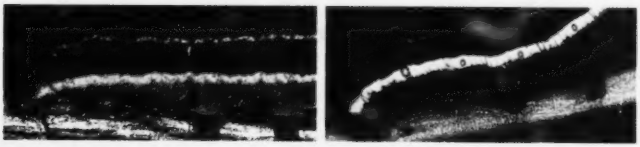
- young caterpillar yellowish with small black spots each bearing a black seta; three pairs of abdominal prolegs;
- in subsequent larval stages they become green, with a light green underside, dorsal surface with three narrow yellowish longitudinal bands and pairs of small white spots; wide white longitudinal band on side; head yellow-green; possibly 5 pairs of abdominal prolegs;



- in the last stage, back becomes brown, then velvety black with more pronounced yellowish bands and dots, spiracles becoming red, then orange; lateral band with a black line beneath; head red;
- length 60 mm at maturity;



- the mature caterpillar is very distinct but the young caterpillar can be confused with that of Putnam's False Looper which, like the False Armyworm, only has 3 pairs of abdominal prolegs; Putnam's False Looper remains green and keeps only 3 pairs of abdominal prolegs when it reaches maturity; that of the False Armyworm has a yellowish thorax with two white dorsal lines running along it and spiracles closely circled in dark brown located on the upper edge of the lateral white line; the last spiracle near the end of the abdomen is clearly above the white line.



False Armyworm

Pupa

- dark brown, approximately 25 mm in length, in the soil.

Adult

- moth with long, trapezoid forewings;
- ground colour brown, marked with brown, grey and charcoal zigzag bands; a small whitish spot on the outer two thirds of the wing;
- hindwings ash grey with contrasting beige margin;
- ash grey thorax, beige head and abdomen;
- wingspan 60 mm;
- at rest, the wings of the moth are rolled around the body, making it look a little like a twig.

Biology

- one generation per year;
- overwinters as adults;
- starting in April, the adults resume their activity;
- females lay their eggs in a mass (100 eggs/mass) on the stalks or lower surface of leaves;
- the eggs hatch starting in late May;
- False Armyworm caterpillars are among the first to be observed in the field;
- very young caterpillars move like loopers;
- the young caterpillars feed during the day, eating the inner part of terminal buds;
- caterpillars of more advanced stages are nocturnal and very voracious, feeding on leaves and flower buds;
- the last larval stage is active until late June;
- before pupation, mature caterpillars burrow into the ground and enter a 2-6 week dormancy period;
- pupation occurs starting in late July;
- the emerge starting in mid-August.

Hosts

Polyphagous species. Found on cranberry but also on willow, poplar, maple, alder, serviceberry, apple, cherry, rose bushes, blueberry, iris, weeds and grasses, such as lawn grasses.

Symptoms

Damage is caused by the caterpillars; on affected plants, only the old foliage and some of the new shoots remain.

Pyrale des atocas
Acrobasis vaccinii Riley
(Lepidoptera: Pyralidae)

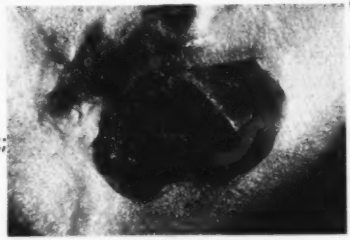
The Cranberry Fruitworm is the most serious pest of cranberry in Quebec. It also causes significant losses in the Maritime provinces and in Massachusetts and Wisconsin. This indigenous species occurs throughout the eastern United States, and south to Florida and Texas. It is also reported in British Columbia and Washington State, where it may have been introduced with cranberry plantations.

Egg

- almost invisible to the naked eye (0.4 mm); elongate oval;
- green when first laid; an orange line visible 1-2 days before hatching;
- after hatching, the whitish wall of the empty egg remains;
- becomes black when parasitized.

Caterpillar

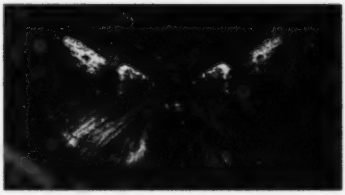
- typical caterpillar, 5 pairs of abdominal prolegs;
- young caterpillar greenish or brownish yellow;
- at maturity, shiny green with a reddish tint on back;
- head pale yellow to reddish;
- length 12-16 mm;
- it becomes permanently installed in the berries; it resembles the Sparganothis Fruitworm, which can also be found inside the fruits: the Cranberry Fruitworm has a black dot on the side of the thorax and the antennae are entirely yellow; the Sparganothis Fruitworm lacks a black dot on the side of the thorax and the tips of its antennae are black.



Pupa

- brownish, length 7-9 mm;
- enclosed in a cocoon in the soil.

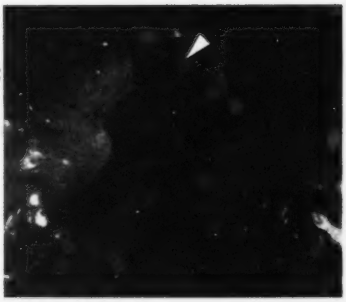
Adult



- mottled coloration predominantly grey;
- forewings with two whitish zones, one narrow and diffuse near the base of the wings, the other above the centre with two small dark spots; presence of a narrow grey zigzagged band near the outer third with small dark spots near the margin;
- hindwings shiny grey, darker at the margin, fringed;
- at rest, wings folded around the body giving the moth the appearance of an elongated tent;
- length 9-10 mm, wingspan 17-20 mm.

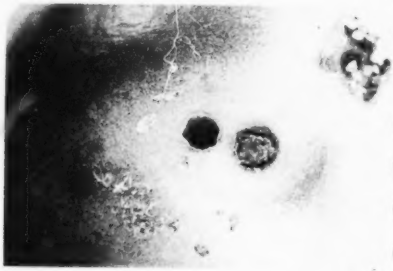
Biology

- one generation a year;
- overwinter at the pre-pupal stage in a cell, transforming into pupae the following spring;
- the pupae complete their development in the spring;
- the moths emerge in June and are present until August; they are active at night and rarely seen during the day;
- oviposition begins when the plants are at the set stage and continues until August;
- the females lay approximately 50 eggs, singly under the lobes of the fruit;
- the eggs hatch 5-10 after laying;



Egg in calyx

- the young caterpillars bore a hole in the berry, enter the fruit and seal the hole with silk;



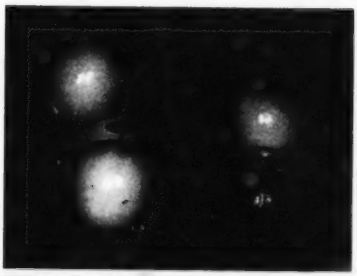
- the young caterpillars continue to seal the entrance holes with silk, but later leave the fruit, often filled with frass (excrement);
- the caterpillars feed from July to September;
- at maturity, they drop to the ground and enclose themselves in a cell made of silk covered with sand and plant debris.

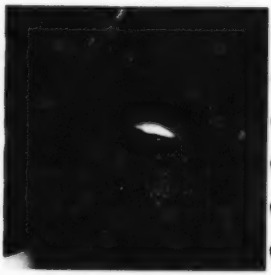
Hosts

Several species of the genera *Vaccinium* (including cranberry and blueberry) and *Gaylussacia* (family Ericaceae).

Symptoms

The caterpillars damage only the fruits, which redden prematurely. One caterpillar can attack 3 to 6 berries, which may be linked by a thread of silk. The entrance hole, covered with silk, can be seen near the peduncle. Caterpillar frass can be found in the fruit. Infested fruits shrivel up and can remain attached to the peduncle until the following spring.



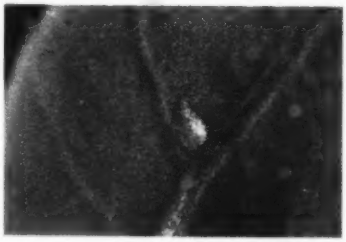


Infested fruit prematurely reddened

Black-headed Fireworm

Tordeuse des canneberges
Rhopobota naevana (Hübner)
(Lepidoptera: Tortricidae)

The Black-headed Fireworm causes serious damage in cranberry producing regions in North America but is less prevalent in the northeast. Its range in Quebec is not well known. The species may have been introduced from Europe, although there is some uncertainty as to its origin. It is widespread in Europe and in eastern Russia and Japan.



Egg

- pale yellow or whitish, more or less transparent, turning red during overwintering;
- flat, in the shape of an oval disk; approximately 0.7 mm in length.

Caterpillar

- typical caterpillar, 5 pairs of abdominal prolegs;
- head, thoracic shield and legs black;
- yellowish or greenish body with very small brownish spots (often indistinct);
- length 10 mm at maturity.

Pupa

- yellow-brown; length 6-7 mm;
- enclosed in loosely woven silk and leaves.

Adult

- small moth with grey or olive brown ground colour with a reddish or coppery tint;
- centre of forewings with a light grey transverse band followed by a brown band;
- hindwings uniformly grey-brown or olive brown, fringed;
- wingspan 10-12 mm;
- at rest, the moth has a small tent-shaped appearance.

Biology

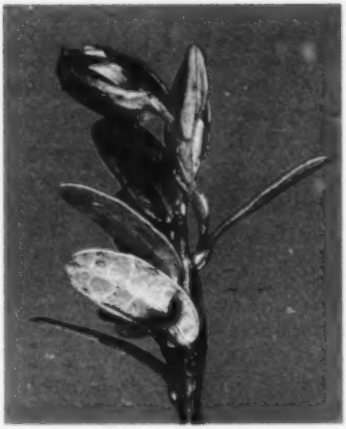
- two generations a year;
- overwinter as eggs;
- eggs hatch in May;
- first-generation caterpillars feed first on old leaves, then on buds and new leaves;
- when disturbed, the caterpillars wriggle vigorously;
- they remain hidden and when exposed, immediately try to hide in leaves or debris;
- emergence of first-generation adults in June;
- 24 hours after their emergence, the females lay their eggs singly on leaves;
- second-generation caterpillars are present in July and feed on flowers, fruits and new shoots;
- second-generation adults emerge in August and are active until mid-September;
- the adults are generally relatively immobile; they have a spurt of activity at dusk and are relatively inactive during the day, except on hot, cloudy days.

Hosts

Several species of *Vaccinium*, including cranberry, and *Erica carnea* L. (Ericaceae); holly (*Ilex*, Aquifoliaceae); apple (*Malus*), hawthorn (*Crataegus*), mountain ash (*Sorbus*), plum and cherry (*Prunus*), pear (*Pyrus*) (Rosaceae); and buckthorn (*Rhamnus*, Rhamnaceae).

Symptoms

In the spring, damage is caused by first-generation caterpillars. The first sign of infestation is the presence of furrows in the leaves. Webs of silk enveloping two or three leaves are then observed at the tip of a new stem. Severely infested areas become brownish because the caterpillars leave only the veins of the leaves.



In summer, damage is caused by second-generation caterpillars which feed on leaves, flowers and fruits. They attack the fruits in a manner similar to that of the Cranberry Fruitworm but do not seal their holes with silk.

Black-headed Fireworm

Cranberry Blossomworm

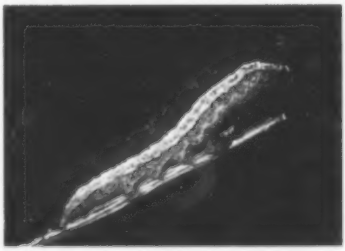
Ver-gris des fleurs d'atocas
Epiglaea apiata (Grote)
(Lepidoptera: Noctuidae)

The Cranberry Blossomworm is an indigenous noctuid moth that is common in cranberry plantations in Quebec and the northeastern United States. It occurs throughout eastern Canada and British Columbia, and probably also in the northern Prairie provinces, where its hosts occur. Although less abundant than the False Armyworm, it can cause serious damage prior to flowering.

Egg

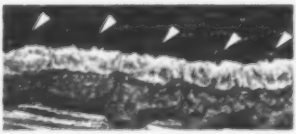
- pale yellow when first laid, becoming brownish;
- rounded, surface striated; approximately 0.7 mm in diameter;
- attached to fallen leaves or plant debris.

Caterpillar

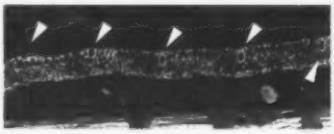


- typical caterpillar, 5 pairs of abdominal prolegs;
- green when very small, quickly becoming reddish brown;
- sides with a very wide white band underlined by an ochre band;
- dorsal surface reddish with 3 fine light longitudinal lines; head reddish black;
- up to 38 mm in length at maturity;
- very similar to the Subdued Quaker, another species of noctuid moth occasionally found in cranberry bogs (see p. 101): in the latter, the 6 spiracles (small black dots on the side) in the centre are located on the lateral white band; in the Cranberry Blossomworm, the 6 spiracles in the centre are located just above the edge of the lateral white band;

this difference is minor but is consistent and reliable; the head of the Cranberry Blossomworm is dark red, that of the Subdued Quaker is red with more or less distinct dark bands; some Subdued Quaker caterpillars have relatively pronounced dark longitudinal bands on their back, but this character is variable.



Cranberry Blossomworm



Subdued Quaker

Pupa

- brown; enclosed in a cocoon made of silk covered with sand;
- approximately 16 mm in length.

Adult

- colour of upper wings variable but predominantly reddish brown, with a pale yellow, almost straight line near the edge and a few fine dark lines elsewhere on the wings;
- most moths have a distinct red or pink tint, which often extends to the lower wings;
- lower wings with pinkish margin contrasting with the rest of the olive brown surface;
- the two reniform spots at the centre of the forewings are also found in adults of many other species of noctuid moths and are not really diagnostic;
- wingspan 38 mm;
- the coloration of the Subdued Quaker moth is very different, with pale grey upper wings crossed by brown zigzag lines and a black line near the edge (see p. 105).

Biology

- one generation a year;
- overwinter as eggs;
- eggs hatch beginning in mid-May;
- caterpillars feed on buds, leaves and flowers and are active primarily at night;
- at maturity, in July, they go into the plant debris and enter a 2-4 week dormancy period;
- pupation occurs in the soil in August;
- the moths emerge in September and can be active until November, temperatures permitting;
- in October, the females lay their eggs singly (100-200) on plant debris;
- the Subdued Quaker, the caterpillars of which are very similar to those of the Cranberry Blossomworm, overwinters at the adult stage in the pupal chamber and the moths emerge very early in the spring (April) to mate and lay eggs; Subdued Quaker caterpillars develop at the same time as Cranberry Blossomworm caterpillars, but are not as prevalent.

Hosts

Genus *Vaccinium* (cranberry and blueberry).

Symptoms

The damage is caused by the caterpillars. The young caterpillars feed on the old leaves, leaving only the veins. They also bore holes in the buds and nip off the blossoms.

Secondary pests

Insects that cause economic damage in some years. They are pests that should be monitored if no intervention is taken to control the primary pests. They are regularly observed in crarberry bogs, but numbers are typically small. Most are polyphagous.

Red-headed Flea Beetle

Altise à tête rouge
Systena frontalis (Fabricius)
(Coleoptera: Chrysomelidae)

The Red-headed Flea Beetle is widely distributed. It occurs in southern Canada, from the Maritimes to the Rockies, and in the United States to northern Florida. In Quebec, small populations of this species have been reported in cranberry bogs in recent years and have caused minor damage. This coleoptera primarily attacks young plantations. It should be noted that there are several other species of flea beetles, all of which are difficult to identify. Some species are known to feed on Vaccinium (including blueberry); however, they have not yet been reported in cranberry plantations.

Egg

- pale yellow and very finely punctate;
- elongate oval, length 0.7-0.8 mm.

Larva

- elongate, cylindrical, three pairs of legs;
- body creamy white with short sparse hairs; head brown; extremity of abdomen with a ventral protuberance resembling a suction cup;
- lives in the soil.

Pupa

- creamy white, body very soft, somewhat resembling a wingless adult with folded legs and antennae;
- in the soil.

Adult

- elongate beetle; completely black, slightly shiny, thin legs;
- upperside of head (between eyes) distinctly reddish; antennae filiform, straight, approximately half the body length;
- body length 4-5 mm.

Biology

- one generation a year;
- overwinter as eggs (primarily) and adults (some adults only);
- eggs hatch from late May to early June;
- underground larvae, feed on roots and go unnoticed;
- emergence of adults from mid-July to August;
- the adults eat foliage;
- eggs laid in soil in August and September.

Hosts

Adult Red-headed Flea Beetles are polyphagous, feeding on the foliage of a wide variety of plants (knotweed, hop, goldenrod, sorrel, currant, poison-ivy, ragweed, alder, oak, iris, impatiens, etc.). It is also found in strawberry, corn, bean, beet, soybean, grape, lettuce, potato, turnip and blueberry crops.

The larvae feed on the roots of a small number of plant species. It is suspected that the roots of knotweed (*Polygonum*) and white goosefoot or lamb's-quarters (*Chenopodium album L.*), annual weeds that are widespread on disturbed lands, are the preferred food of the larvae.

Symptoms

Damage caused by red-headed flea beetles in cranberry bogs is detectable in August. The damage is caused by adults, which chew on the leaves from underneath, leaving only the veins. They also bore holes in the fruits. Damaged areas are detected in the fields by their slightly brownish appearance. Very minor damage caused by larvae to cranberry roots has been observed in Wisconsin.

Red-headed Flea Beetle

Big Cranberry Spanworm

Arpenteuse bituberculée
Eutrapela clemataria (J.E. Smith)
(Lepidoptera: Geometridae)

The Big Cranberry Spanworm is present in most cranberry plantations in Quebec. It is one of the largest spanworms. This indigenous species is widespread from the Maritimes to the Prairies and in the eastern half of the United States.

Egg

- oval, smooth surface; diameter 0.8 mm;
- green when first laid, turning reddish, then black just before hatching.

Caterpillar

- looper caterpillar with 2 pairs of abdominal prolegs;
- young caterpillar dark brown or blackish;
- intermediate and mature caterpillars grey, without distinct hairs, with two brown tubercles near the centre of the back and a dorsal hump at the last abdominal prolegs;
- spiracles orange or yellow;
- back with pairs of small brown spots and small yellow dots;
- head with black transverse band;
- 60 mm at maturity.

Pupa

- coffee brown, with black-brown specks; length 16-20 mm.

Adult

- beige;
- upper wings with brown areas, with a diagonal line doubled with a fine white line; anterior margin lighter; tips sometimes tapered to a point; surface sometimes with fine dark specks;
- lower wings light beige with a fine brown oblique line (sometimes indistinct);
- wingspan 32-45 mm.

Biology

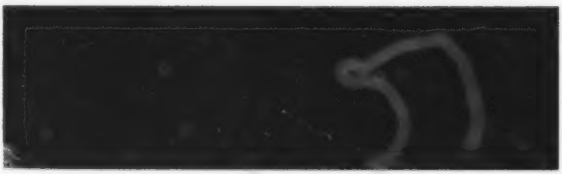
- one generation a year;
- overwinter as pupae in a cocoon in the soil;
- emergence of adults in about mid-May;
- oviposition beginning shortly afterward;
- eggs laid in clusters (up to 400) on stems;
- caterpillars present in June and July, feed on leaves and blossoms (hook and bloom stages);
- like many spanworms, when disturbed, the caterpillars stiffen, resembling a stalk or twig.

Hosts

Polyphagous species. Attacks cranberry, but also various trees and shrubs (sweet gale, birch, poplar, maple, plum, serviceberry, willow, arrow-wood, linden, ash, elm, hemlock, fir, spruce).

Symptoms

Damage is caused by the caterpillars. This voracious spanworm feeds on the cranberry blossoms. During blossoming, the damage appears as dark areas in the field. Infestations are localized.



Spiny Looper

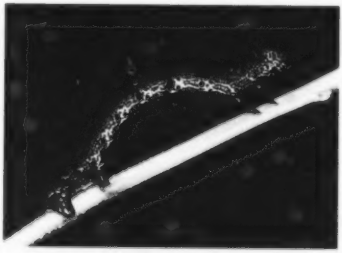
Arpenteuse épineuse
Phigalia titea (Cramer)
(Lepidoptera: Geometridae)

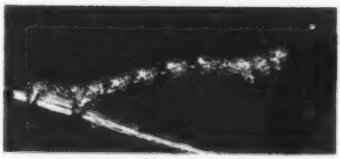
The Spiny Looper was detected on several farms in Quebec in 1998. This species is very widespread in Canada east of the Rockies and in the United States south to Florida and Texas. In the past several epidemics have been reported in a number of states in the northeastern United States where forest plots were defoliated.

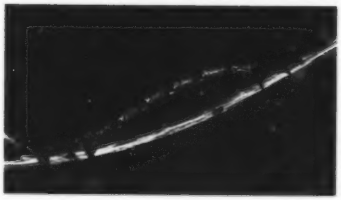
Egg

- yellow-green, turning yellow orange then dark orange;
- oblong, surface vaguely reticulate; approximately 0.8 mm in diameter

Caterpillar







- looper spanworm with 2 pairs of abdominal prolegs;
- ground colour ranging from dark brown to grey brown with many fine white wavy longitudinal lines (sometimes light orange) edged with black;
- young caterpillar with whitish unbroken lateral band;
- intermediate and mature caterpillars have a series of irregular yellow or orange spots and black tubercles on the side;
- gradually becomes lighter with maturity;
- head tan with black mottling; legs black;
- body covered with stiff, black hairs, more prominent in young caterpillars;
- approximately 40 mm in length at maturity;

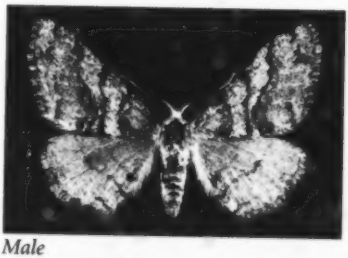
- the only other caterpillar with a somewhat similar coloration is the Stout Spanworm (p. 53), which can be distinguished from the spiny looper by the absence of long hairs and reddish legs.

Pupa

- brown, length 14-18 mm;

Adult

- males and females differ in appearance;
- male with normal wings, ground colour light beige, forewings streaked with wavy brown and dark brown bands; hindwings crossed by 2-3 fine wavy dark bands; antennae pectinate; wingspan 30-40 mm;



Male

- female with wings reduced to stubs, incapable of flying, body dark pepper grey, antennae filiform approximately two thirds the length of the body; length 12-14 mm.

Female

Biology

- one generation a year;
- overwinter as pupae in the soil;
- emergence of adults in April;
- males emerge a few days before the females; at rest, can be seen attached to stems and tree trunks;
- at emergence, the females climb onto the stems to mate;
- eggs laid in fissures in the stems, in masses of up to 600 eggs;
- caterpillars present from mid-May to mid-June;
- young caterpillars first attack the buds, later devouring entire leaves.

Hosts

Polyphagous species attacking many hardwood trees and shrubs (linden, elm, birch, poplar, maple, oak, beech, hickory, apple, dogwood, blueberry, cranberry).

Symptoms

Damage caused by caterpillars in cranberry bogs is localized. Mature caterpillars are very voracious and can completely defoliate the plants. In infested areas, large numbers of caterpillars are found clinging to the stems.

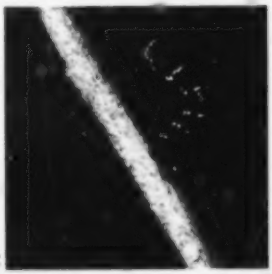
Stout Spanworm

Arpenteuse piquée jaune
Lycia ursaria (Walker)
(Lepidoptera: Geometridae)

The Stout Spanworm is found in most plantations in Quebec. This indigenous species is less abundant than the Big Cranberry Spanworm. It is one of the largest spanworms. It occurs across Canada and the United States, south to New Jersey and Colorado.

Egg

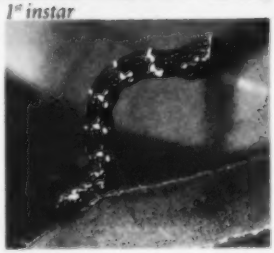
- green when first laid, becoming steel-blue shortly before hatching;
- oval, approximately 0.9 mm.



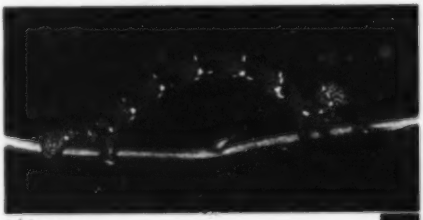
1st instar

Caterpillar

- young caterpillar black with white bands;
- 2nd instar, black or dark grey with light yellow dots and broken lines;
- 3rd instar, violet blue with salmon or pink lines, back with transverse yellow bands, side with yellow spots and irregular black markings, head pink with black dots;
- 4th instar like 3rd but with broken, indistinct pink lines, yellow spots smaller;
- 5th and last instar light grey or bluish grey with wavy lines finely edged with black and yellow spots, true legs reddish;

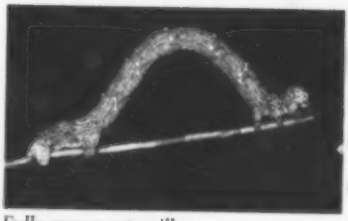


2nd instar



3rd instar

- length 60 mm at maturity;
- resembles to some extent a Spiny Looper, which has a somewhat similar coloration but which is distinguishable by its erect hairs, black legs and the details of the spots.



Fully grown caterpillar

Pupa

- brown, approximately 25 mm in length.

Adult

- body hairy; ground colour grey or speckled beige;
- forewings pale grey with dark brown or blackish transverse bands; hindwings lighter, with dark ill-defined transverse bands; antennae of the male pectinate;
- wingspan 40-47 mm.

Biology

- one generation a year;
- overwinter as pupae in soil;
- emergence of adults in the spring;
- eggs laid in a mass (150 to 200 eggs/mass);
- caterpillars present starting in June; feed on new leaves and blossoms.

Hosts

Polyphagous species. On cranberry but also on various trees and shrubs (dogwood, birch, alder, linden, poplar, elm, ash, apple, cherry, maple, blueberry).

Symptoms

Damage is caused by the caterpillars. This voracious spanworm defoliates the plants, leaving only the stems. Concentrated damage appears as dark areas in the fields. Infestations are localized.

Cranberry Weevil

Charançon des atocas
Anthonomus musculus Say
(Coleoptera: Curculionidae)

The Cranberry Weevil is an important pest in the northeastern United States. It is an indigenous species that occurs throughout North America, but is not very abundant in Quebec. There is a very large number of species of weevils that are superficially similar in appearance and that feed on a very wide variety of plant species. Several of these species may occur around cranberry bogs. Differentiating them is very difficult and usually requires the assistance of an expert. As a example, *Ceutorhynchus neglectus*, often found in association with *Anthonomus musculus* in cranberry bogs, is illustrated.

Larva

- minuscule, white, thick-bodied, legless, comma-shaped worm;
- head brown or red.

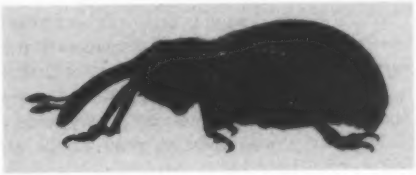
Pupa

- whitish, turning brown shortly before emergence of the adult;
- length 0.9-2.0 mm.

Adult

- Weevils are small beetles easily recognizable by the beak-like projection on their head (called a rostrum) which is approximately one-third their body length and bears the antennae.

- *Anthonomus:* reddish brown, light at emergence turning dark after several days; length 1.5-2.0 mm; head black-brown, somewhat darker than the rest of the body; black with two transverse whitish ill-defined bands meeting at the centre.



- *Ceutorhynchus:* stout, rounded, convex, with the latter half or third of the back generally red; markings on the back mottled, varying from white to yellow to red, white markings sometimes cover a large part of the back; legs lighter than body, orange or red; length 1.5-2.0 mm; *Ceutorhynchus* attack crucifers, some of which are widespread weeds (cress and mustard).

Biology (*Anthonomus*)
- one generation a year;
- overwinter as adults in winter-flooded fields or on the periphery of cranberry fields;

- in the spring, after the flood waters retreat, the overwintered adults are active on hot, still days;
- they feed on leaves and buds, then on new foliage and blossoms as the plants develop;
- mating takes place in May and early June;
- the females lay their eggs singly between the petals of the blossoms;
- hatching occurs 3-9 days after oviposition;
- larval development and pupation take place inside the flower;
- the adults emerge 5-6 days after pupation, when the fruits are beginning to form;
- in July and August, they feed on leaves, fruits and buds;
- in mid-August, the adults migrate to plant debris.

Hosts

Several species of the genera *Vaccinium* (including cranberry and blueberry) and *Gaylussacia* (Ericaceae).

Symptoms

Damage is caused by the larvae and adults. The adults bore small holes in the buds, causing browning which resembles the effect of frost. At the hook and bloom stages, the females bore an oviposition hole in the blossoms, which can cause the flower to drop off. The larvae feed on the flower buds, leaving only the petals and ovary walls. The infested buds turn from pink to orange and eventually fall off. At the end of the summer, the adults of the new generation cause damage by boring holes into the fruits.

Rusty Tussock Moth

Chenille à houppes rousses
Orgyia antiqua (Linné)
(Lepidoptera: Lymantriidae)

The Rusty Tussock Moth is a forest insect that is very common in Quebec, and is overabundant in some years. It rarely causes serious damage in cranberry plantations. This exotic species originated in Europe. In Canada, its range is transcontinental, extending south to the central United States.

Egg

- rounded, 0.9 mm in diameter;
- whitish with a centre spot.

Caterpillar

- 5 pairs of abdominal prolegs;
- young caterpillar brown with beige, yellow and orange markings and very long hair;
- in subsequent stages, body grey or black, covered with long white, golden and black hair, 4 very dense white or red dorsal tufts resembling brushes;
- two very long black brushes or tussocks projecting forward, two on the side and a similar one projecting backwards; sides and rear section of back have prominent bright red "warts";

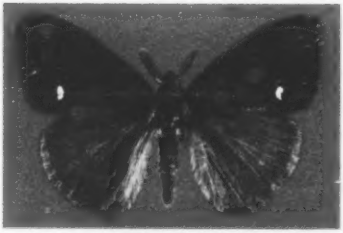
- at maturity, 25-35 mm in length;
- the only other species that resembles the Rusty Tussock Moth is the Whitemarked Tussock Moth, which is distinguishable by its yellow body, the absence of the 2 lateral brushes and fewer red "warts"; despite their names, the colour of the tussocks is not a reliable character for distinguishing between these two closely related species.

Pupa

- enclosed in a dense yellow-grey silk cocoon firmly attached to branches.

Adult

- male and female markedly dissimilar in appearance;
- male: typical moth with brown forewings with blackish streaks and white crescent-shaped marking; hindwings rusty; antennae pectinate; wingspan 25-30 mm;
- female: hairy, obese, wingless, yellowish grey, length 15-18 mm.



Male

Female on its cocoon with freshly laid eggs.

Biology

- one generation a year;
- overwinter in the egg stage;
- eggs hatch in late spring;
- caterpillars beginning feeding in late May on buds, leaves and flower buds;
- cocoons on stems;
- adults in August and September;
- the females lay their eggs in masses on the cocoons from which they emerge;
- adults are diurnal, the male flies in broad daylight, especially in the early afternoon.

Hosts

Polyphagous species. Found on cranberry but also on several hardwoods and conifers (fir, spruce, larch, pine, birch, willow, poplar, alder, maple, apple, elm, blueberry, etc.).

Symptoms

The damage is caused by the caterpillars, which defoliate the plants. Infestations are generally localized and the damage appears as dark areas in the fields.

Speckled Green Fruitworm

Orthosie verte
Orthosia hibisci (Guenée)
(Lepidoptera: Noctuidae)

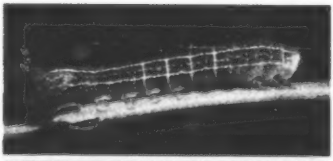
In Canada, the Speckled Green Fruitworm occurs in all provinces, except Prince Edward Island, and is most prevalent in the Prairie provinces. It has been reported in southern California and Florida, but is more common in the eastern United States.

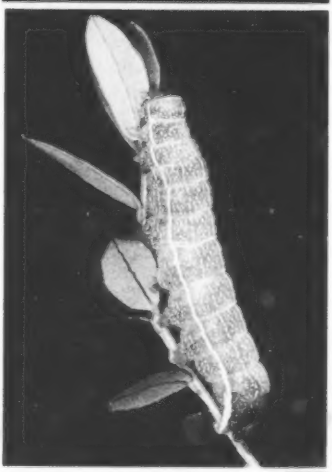
Egg

- white to translucent, with a dark grey area or band eventually developing;
- rounded, surface with fine vertical ribs; approximately 0.65 mm in diameter

Caterpillar

- typical caterpillar with 5 pairs of abdominal prolegs;
- young caterpillar leaf green with 5 distinct white lines, one on the back and two on each side; unbroken dorsal line, lateral lines often broken;
- in the middle of its development, becomes apple green with many small white dots, with all lines more or less distinct, except the lateral line (at the spiracles) which is generally prominent and descends to the tip of the last pair of abdominal prolegs; the lateral line is sometimes indistinct;





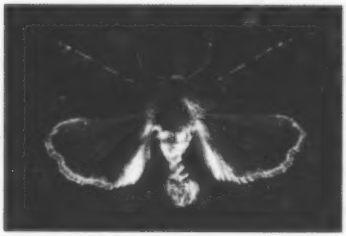
- light blue green at maturity with most lines thin or indistinct;
- length up to 40 mm;
- young caterpillar very similar to that of the Rear-humped Caterpillar, which is yellow-green or glaucous; intermediate and mature caterpillars of the Rear-humped Caterpillar (p. 95) are easily distinguishable by a prominent hump at the rear of the back and a yellow and white lateral line with black spiracles.

Pupa

- initially greenish, turning orangey brown and then dark brown;
- length 16-19 mm.

Adult

- moth robust, head and thorax grey-brown, hairy;
- forewings brown, anterior margin with irregular light grey zones and short dark brown oblique bands; centre with a reniform spot and an oval spot outlined with a white line;
- hindwings olive grey with a darker spot in the centre; margin with short light fringe;
- wingspan 38-43 mm;
- adult very similar to that of the Subdued Quaker (p. 104), another occasional pest of cranberry, but whose caterpillars resemble those of the Cranberry Blossomworm.



Biology

- only one generation per year;
- overwinter as pupae, buried in the soil in a cell;
- adults emerge from late April to early May; active at night;
- females lay on average 150 eggs, in irregular masses, early after their emergence;
- incubation last approximately 5 days;
- caterpillars appear in about mid-May, may be present until late August;
- young caterpillars active during the day, more mature caterpillars nocturnal, hiding during the day;
- the caterpillars feed on leaves, flower buds and flowers; they are very voracious in the latter stages.

Hosts

Polyphagous. In addition to cranberry, feeds on many deciduous species (poplar, birch, oak, hickory, linden, alder, cherry, apple, plum, raspberry, rhododendron, gooseberry, etc.). The Speckled Green Fruitworm is an important pest of apple; it eats the leaves and young fruits. It sometimes causes damage to strawberry fields in Quebec.

Symptoms

Damage is caused to the leaves, flower buds, and flowers, but the fruit may also be attacked.

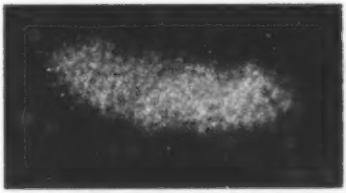
Sparganothis Fruitworm

Tordeuse soufrée
Sparganothis sulfureana (Clemens)
(Lepidoptera: Tortricidae)

The Sparganothis Fruitworm is indigenous. It is an important pest in several states in the U.S. Northeast, and has also been reported in certain states in the Northwest. In Quebec, this insect is found in most plantations but until now, has not caused severe damage.

Egg

- eggs laid as flat, oval cluster, greenish yellow; approximately 6.0 x 2.5 mm.

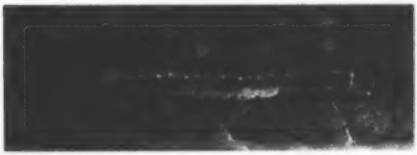


Caterpillar

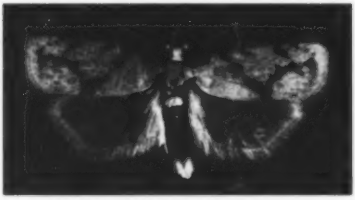
- typical caterpillar, 5 pairs of abdominal prolegs;
- very young caterpillar yellowish with blackish head; can be confused with Black-headed Fireworm;
- at maturity, caterpillar greenish yellow or grey, back marked with pairs of white dots, head yellow or red with partially black antennae;
- length 13-17 mm.

Pupa

- dark brown, length approximately 8 mm.



Adult



- small bright yellow moth;
- forewings yellow with red, orange or red brown markings, and two bands forming an X when the wings are folded over the body;
- hindwings olive brown, fringed with golden yellow;
- length 7-8 mm; wingspan 14-20 mm.

Biology

- two generations a year;
- overwinter in the larval stage in leaf debris on the ground;
- at budbreak, the first-generation caterpillars emerge from overwintering;
- when disturbed, the caterpillars wriggle vigorously;
- in May and June, they feed on leaves and flower buds;
- the adults emerge starting in mid-June;
- one to two days after emergence, the females lay their eggs in masses (20-50 eggs/mass) on the upperside of leaves, on the fruits and on weeds;
- second-generation caterpillars are present starting in late July and feed on leaves and fruits;
- the second-generation adults emerge in early August and are active until the end of September.

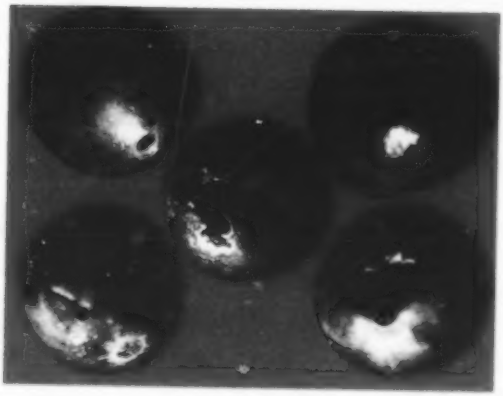
Hosts

Polyphagous species. Cranberry but also blueberry, apple, hawthorn, celery, strawberry, corn, clover, alfalfa, sumac, sweet fern, and in forests, white spruce, fir, red pine, Eastern white pine and willow.

Symptoms

In spring, the damage is caused by the first-generation caterpillars emerging from overwintering; they feed on new shoots and weave webs on the foliage; at maturity, they can damage flower buds.

In summer, the second-generation caterpillars attack the fruit; in August, it is possible to detect the presence of a cluster of red and green fruit bound in a web. The surface of the fruits are eaten, the fruits are emptied and there is a large hole at the base. The damage is found in localized areas, often along the edges of fields. Infestations are more abundant in high-yield fields and in weed-free fields.



Minor pests

Insects that rarely cause economic damage. They are occasionally observed in bogs and their populations are small.

Impressed Dagger Moth

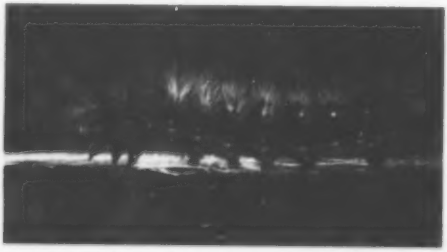
Acronicte impressionnée
Acronicta impressa Walker
(Lepidoptera: Noctuidae)

The Impressed Dagger Moth is an indigenous species that is very widespread throughout Canada and most of the United States.

Caterpillar

- 5 pairs of abdominal prolegs;
- body covered with stiff hairs in tufts originating from black shiny humps or protuberances, hairs longer at the ends of the body than in the centre;
- young caterpillar with black back edged with an orange band on each side, head and legs black, sides of body black with yellow line;

- intermediate caterpillar with hairs in the centre of the back white turning to orange near the head and with black tufts at the end and near the head;
- mature caterpillar with orange hairs in the front and near the end, those in the centre of the back and sides white; sides with orange line and spiracles white;
- despite the variation in coloration, Impressed Dagger Moth



caterpillars are very distinct from all other noctuid moths found in cranberries.

Pupa

- dark brown, length approximately 15 mm;
- in a white silk cocoon enclosed in a rolled leaf.

Adult

- forewings with grey ground colour, with grey-black streaks forming irregular transverse zigzag bands;
- hindwings light grey with fine olive brown lines;
- wingspan 30-38 mm.

Biology

- two generations a year;
- overwinter as pupae in a cocoon in plant debris in the ground;
- flight period of the adults from late May to mid-June (1st generation) and from mid-July to late August (2nd generation);
- caterpillars from mid-June to late in September but primarily late July and August;
- the caterpillars feed on leaves, flower buds and flowers.

Hosts

Polyphagous species on trees and primarily woody shrubs (willow, poplar, birch, alder, beech, serviceberry, cherry, hazel, gooseberry, blackberry, rose, sweet gale, etc.).

Horned Spanworm

Arpenteuse à pointes
Nematocampa resistaria (Herrich-Schäffer)
(Lepidoptera: Geometridae)

Very widespread species found throughout Canada and in most of the United States, south to Florida and California. Until recently, this species was known by the name *Nematocampa limbata* (Haworth).

Egg

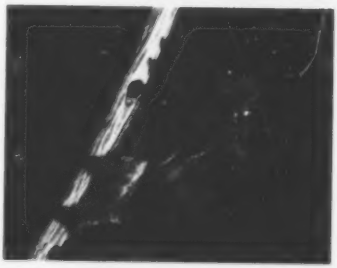
- cylindrical with a truncate end;
- light green turning reddish; smooth surface;
- length approximately 0.7 mm.

Caterpillar

- typical spanworm with 2 pairs of abdominal prolegs;
- two sets of dorsal white-tipped extensible tentacles;
- young caterpillar yellow brown with darker irregular markings;
- mature caterpillar dark brown, occasionally with purple hue;
- length 20 mm at maturity;
- no other caterpillar looks like it.

Pupa

- light brown with the posterior half of the abdomen a contrasting dark brown;
- length 8-10 mm.



Adult

- forewings light yellow with fine brown lines, transverse bands and a large patch near the edge;
- basal half of hindwings yellow with fine lines and apical half brown;
- female lighter than the male, light parts creamy white rather than yellow;
- wingspan 19-25 mm;
- this species is easily distinguishable from all others by its coloration.

Biology

- one generation a year;
- overwinter in the egg stage;
- caterpillars present early in May until June; defoliators;
- pupation in leaves for 16-17 days;
- adults from mid-June to mid-August;
- eggs laid in small clusters.

Hosts

Polyphagous species attacking primarily woody species (mountain-ash, alder, willow, birch, oak, dogwood, sweet gale, fir, spruce, hemlock, cherry, rose, blackberry, gooseberry, blueberry, cranberry).

Arpenteuse à taches
Iridopsis ephyraria (Walker)
(Lepidoptera: Geometridae)

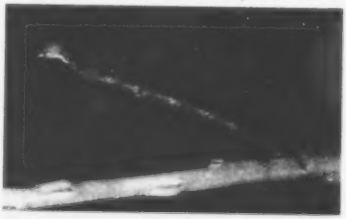
This species occurs in southern Canada, from Nova Scotia to Alberta, and in a large part of the United States, south to Florida and Texas. Until recently, this species was known as *Anacamptodes ephyraria.*

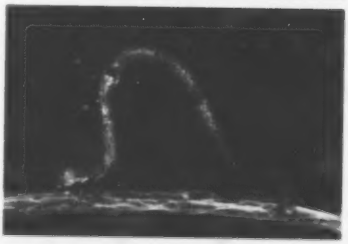
Egg

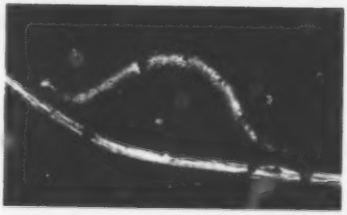
- elongate oval, with truncated end, surface covered with small ribs;
- greenish when first laid, turning rusty; approximately 0.75 mm.

Caterpillar

- typical looper with 2 pairs of abdominal prolegs;
- young caterpillar with dark grey body, rusty head contrasting with body, tip of the abdomen yellowish;
- as it develops, becomes grey brown or brown with very fine light ill-defined markings; side with a black spot slightly in front of the centre, often preceded by a small white patch; 4 small black spots along the posterior half of the abdomen;
- length 22-26 mm at maturity.







Pupa

- brown, tip of the abdomen with a short extension (called cremaster);
- length 10-12 mm.

Adult

- moth with light grey ground colour, forewings and hindwings with blackish and reddish transverse and oblique streaks; longest of the wavy lines of the forewing with pronounced curve (see arrow on the photo); antennae pectinate in the male, filiform in the female;
- wingspan 22-30 mm;
- coloration can be easily confused with the bark of trees on which it rests;
- species that resembles many other geometers.

Biology

- one generation a year;
- apparently overwinters in the egg stage;
- caterpillars from June to early July;
- like many loopers, the caterpillars hold their bodies elongated and stiff, attached by their abdominal prolegs to resemble a stalk or twig;
- pupae in the soil for 13-20 days;
- adults active in July and August;
- the females lay their eggs in clusters under bits of raised bark.

Hosts

A defoliator which attacks several species of trees and shrubs, including willow and elm, occasionally birch, maple, oak, ash, cherry, apple, arrow-wood, gooseberry, fir and hemlock. Cranberry had not previously been reported as a host plant and it is uncertain whether the use of this plant is common or regular.

Small Engrailed

Arpenteuse bossue
Ectropis crepuscularia (Denis & Schiffermüller)
(Lepidoptera: Geometridae)

The Small Engrailed is commonly found in forest environments. The species has a very wide holarctic range, i.e., it occurs naturally in Europe and North America. On our continent, it occurs virtually everywhere, from coast to coast, north to Alaska and south to Florida.

Egg

- oval, smooth surface; light yellow green; approximately 0.6 mm in diameter;
- eggs laid in a cluster covered with a thin web of silk.

Caterpillar

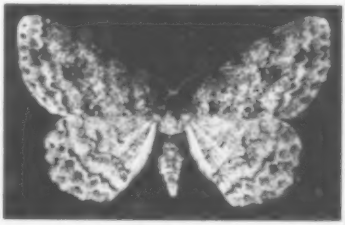
- typical looper with 2 pairs of abdominal prolegs;
- head truncated and body stout with highly variable coloration;
- young caterpillar dark brown with a white mark above the second pair of abdominal prolegs, indistinct when the caterpillar ages and becomes lighter in colour;

- at intermediate stages, body marbled brown with a very distinct blackish V-shaped mark in the centre of the back;
- mature caterpillar generally marbled grey brown, often with reddish irregular trapezoid markings on the back; last abdominal segment slightly humped with a dark arched band;
- approximately 32 mm at maturity;
- at rest, the caterpillar holds its body stiff, often held by a taut strand of silk starting at the head and attached to the plant;
- its ill-defined marbled appearance and the light band of the first pair of abdominal prolegs distinguish it from other loopers present in cranberry.

Pupa

- greenish gradually turning dark brown;
- length 12-15 mm.

Adult



- moth light beige with brown markings; apical half of wings with 3 irregular transverse streaks, outside margin with row of black dots; the dark markings vary from specimen to specimen;
- wingspan 25-37 mm;
- relatively indistinct and resembles several other species of geometers that occur in the surrounding environment.

Biology

- two generations a year;
- overwinter as pupae in the soil;
- adults nocturnal, present from late April to June (1st generation) and from late June to September (2nd generation);
- eggs laid in clusters of 10 to 20 in cracks under the bark of trees and covered with a thin layer of furry scales;
- caterpillars present from late May to early September but more numerous in June, reaching maturity in approximately 40 days;
- in forests, the caterpillars feed on the ground when young and gradually climb into trees as they develop.

Hosts

Polyphagous species attacking a variety of woody trees and shrubs (larch, spruce, willow, birch, alder, hemlock, fir, apple, poplar, cherry, elm, pine, dogwood, oak, maple, currant, walnut, ash, buffaloberry, blueberry, cranberry).

Symptoms

In cranberries, pockets of Small Engrailed infestation are concentrated along the edges of fields. The caterpillars attack new leafs and flower buds. The infested areas appear darker and are devoid of fruit.

Rannock Looper

Arpenteuse brune
Macaria brunneata (Thunberg)
(Lepidoptera: Geometridae)

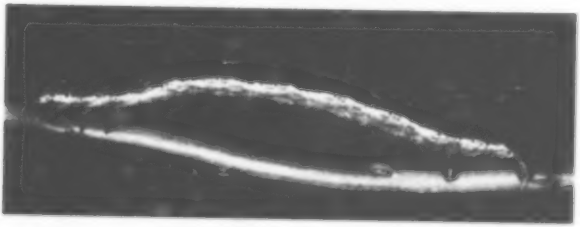
This is a holarctic species found throughout Canada and in the northern United States, as well as in the mountains and in northern Europe, Siberia and Japan. Until recently, this species was known by the name Itame brunneata.

Egg

- elliptical, light yellow then becoming dark brown;
- surface reticulate; length approximately 0.6 mm.

Caterpillar

- typical looper with 2 pairs of abdominal prolegs;
- young caterpillar with brownish back, side of each segment with an elongated black mark separated by a whitish area;
- head reddish brown with black markings; true legs brown, abdominal prolegs reddish;
- at the last stage, brick red back with greenish tint, finely lined; side with yellow-white line starting at the head and running to the last pair of abdominal prolegs;
- length approximately 25 mm at maturity.



Pupa

- light brown to dark brown, abdomen somewhat lighter than the rest of the body;
- length 9-10 mm.

Male

Adult

- male red-brown, almost without spots, antennae slightly pectinate;
- female red to burnt orange, anterior margin of forewings with 4 dark spots extending onto the surface of the wing as faint transverse lines, fringe with several dark spots; hindwings with 4 dark spots on the fringe and an indistinct transverse band in the centre; antennae filiform;
- wingspan 20-27 mm.

Female

Biology

- one generation a year;
- overwinters in the egg stage; hatching early in the spring;
- caterpillars from May to mid-June; the caterpillars feed on terminal buds and foliage;
- pupation in June, lasting 13-23 days;
- flight period of adults from mid-June to late July;
- the females can lay up to 125 eggs, deposited on the stems and twigs of plants or on the ground near host plants.

Hosts

Trembling aspen, buffaloberry; white birch, blueberry and cranberry (*Vaccinium*).

Symptoms

In cranberry, the caterpillars prefer to feed on new shoots and damage is visible if there is an abundance of caterpillars.

Chain-spotted Geometer

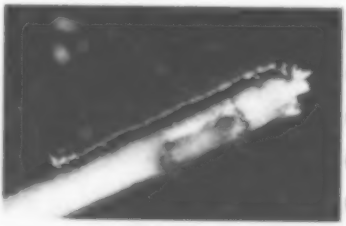
Arpenteuse caténaire
Cingilia catenaria (Drury)
(Lepidoptera: Geometridae)

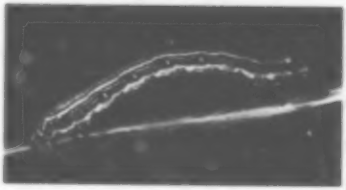
The Chain-spotted Geometer occurs from eastern Canada to Alberta, and in the United States to Colorado and New Jersey. This species causes serious damage in the Maritime provinces and sometimes in Massachusetts.

Egg

- initially yellow green, quickly taking on a purplish tint and becoming darker as they age;
- elliptical, surface with fine polygonal reticulation; length approximately 0.8 mm.

Caterpillar





- typical geometer with 2 pairs of abdominal prolegs without visible hairs;
- very young caterpillar grey-green with a pale white line on the side; head, legs and thoracic shield black;
- intermediate and mature caterpillars longitudinally striated with yellow, white and black, dorsal band yellow edged with black, black lateral band with white spots; head and abdominal prolegs light with large black dots;
- up to 45 mm in length at maturity;
- Black Spanworm caterpillars (p. 22) are the only other loopers that have a coloration of black, yellow and white like the Chain-spotted Geometer although their coloration is predominantly black (black back) and their body has short but distinct erect hairs.

Pupa

- whitish with black and yellow dots; length up to 20 mm.

Adult

- very light grey, head orange or yellow;
- forewings and hindwings with two transverse lines consisting of black dots, with a black spot in about the centre;
- abdomen of the female with black transverse bands;
- in males, antennae pectinate, in females, antennae filiform;
- wingspan 30-35 mm in females, up to 40 mm in males.

Biology

- one generation a year;
- overwinters in the egg stage on leaves on the ground;
- caterpillars present in early summer;
- develops slowly and reach maturity in late July or in early August;
- the caterpillars feed on foliage;
- at maturity, they tend to remain straight and immobile, with the head down during the day;
- pupae enclosed in a loose, net-shaped yellow cocoon attached to leaves; pupation 3-4 weeks;
- adults emerge in September or early October;
- adults diurnal; the moths are sometimes present in large enough numbers to give the impression that it is snowing;
- oviposition in about mid-September or after; a female can lay over 360 eggs on the surface of leaves.

Hosts and symptoms

Polyphagous on various woody trees and shrubs: birch, oak, poplar, willow, cherry, alder, larch, fir, spruce, pine, sweet fern, blueberry, cranberry, etc. Also reported as pest of commercial blueberry crops.

The early larval stages skeletonize the leaves on which they feed and the more mature caterpillars completely defoliate new shoots.

Cleft-headed Looper

Arpenteuse cornue
Biston betularia (Linné)
(Lepidoptera: Geometridae)

This looper is very widespread in Canada and the United States, as well as in Europe. It occurs primarily in moist woods and peat bogs.

Egg

- whitish green, rectangular side view;
- surface with fine polygonal reticulation, approximately 0.7 x 0.5 mm.

Caterpillar

- typical looper with 2 pairs of abdominal prolegs;
- young caterpillar greenish brown with pinkish specks; head with two protuberances resembling cat's ears;
- intermediate caterpillar reddish to olive brown;
- at maturity grey with slight purple tint, head yellow brown with purple "ears", abdomen with a pair of small yellow humps on the upperside of the last segment and pairs of small white spots on the back of each segment;
- length up to 60 mm;

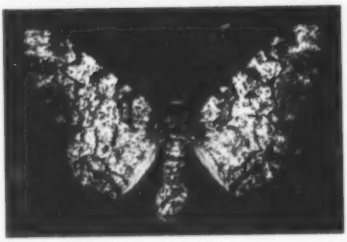
- this species of looper is easily distinguishable from all others by the "ears" on the head and the large size of the caterpillars at maturity.

Pupa

- blackish brown;
- length 20-28 mm.

Adult

- moth with robust, hairy body, salt and pepper; forewings salt and pepper with two black-brown transverse streaks;
- male often with darker forewings with black-brown areas, antennae highly pectinate;
- female with antennae filiform;
- a certain proportion of the adults (up to 10% in southern Quebec) are almost black;
- wingspan 35-60 mm.



Biology

- one generation a year (a second partial generation reported in some favourable years);
- overwinter as pupae in the soil;
- flight period of the adults long, from late May to early August;
- eggs laid in large masses on vegetation;
- caterpillars active from July to late September, devour the foliage.

Hosts and symptoms

Polyphagous. Feeds on many species of woody trees and shrubs. Prefers willow and paper birch but also attacks cranberry. The caterpillars cause visible defoliation.

Hemlock Looper

Arpenteuse de la pruche
Lambdina fiscellaria (Guenée)
(Lepidoptera: Geometridae)

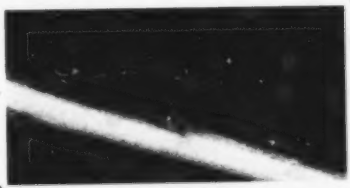
The Hemlock Looper is a defoliating insect native to North America. The species occurs throughout Canada and in the northern United States. It prefers moist forests, preferably coniferous, but is also found in deciduous and mixed forests.

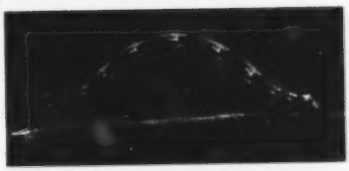
Egg

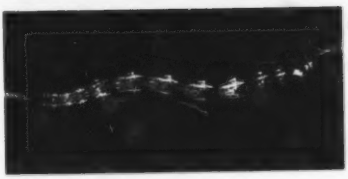
- ellipsoid, shiny green, turning dull reddish brown after several days;
- surface almost smooth; length approximately 0.75 mm.

Caterpillar

- typical looper with 2 pairs of abdominal prolegs, slender body;
- young caterpillar light grey with blackish longitudinal broken lines; head and legs black;
- intermediate caterpillar very light grey, sometimes with a slight greenish tint, body with broken black lines, head grey with irregular spots and black dots, first pair of abdominal prolegs yellowish;
- mature caterpillar with marbled appearance, back light grey with one pair of small black dots and one pair of reddish spots on each segment, side marbled with a straight reddish line and narrow, elongated black spots, legs yellow-grey;
- length approximately 32 mm at maturity.



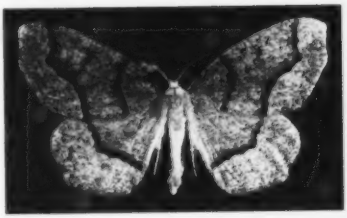




Pupa

- honey yellow;
- length approximately 20 mm.

Adult



- moth beige, body yellowish;
- wings with dense dark grey flecks, forewings with a dark brown dot in the centre and crossed by two dark brown bands edged with yellow; hindwings with a transverse band;
- male with pectinate antennae, female with filiform antennae;
- wingspan 23-45 mm.

Biology

- one generation a year;
- overwinter in the egg stage;
- caterpillars present from mid-June to mid-August;
- the young caterpillars feed on new shoots; when older, they may feed on old foliage;
- pupation for 15-20 days;
- adults present from August to September;
- eggs laid singly or in small groups of 2-3, everywhere, from the forest litter to the branches.

Hosts and symptoms

Polyphagous but prefers conifers (hemlock, fir, spruce, larch, pine); also blueberry and cranberry (*Vaccinium* spp.). However, during epidemics, the insect will attack many other coniferous and even deciduous species (birch, poplar, maple, willow, beech, etc.) and completely defoliate sectors of forest. It is a major defoliator of our boreal forests.

Zebra Caterpillar

Chenille zébrée
Melanchra picta (Harris)
(Lepidoptera: Noctuidae)

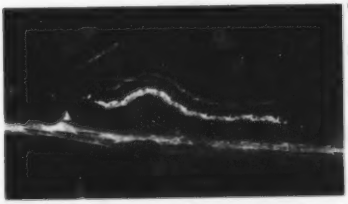
This indigenous noctuid moth occurs throughout Canada and in large parts of the United States.

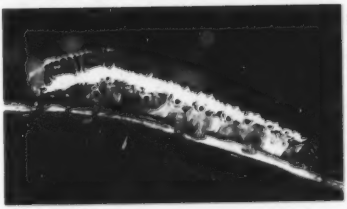
Egg

- light yellowish green turning brown and finally dark blue-black;
- spherical, flat, surface covered with fine lines; approximately 0.65 mm in diameter;

Caterpillar

- caterpillar black with 5 pairs of abdominal prolegs, very striking and very distinct;
- ground colour bright yellow with wide black longitudinal bands intersected by many fine white transverse streaks, which are more numerous and more pronounced on mature caterpillars;
- head rusty brown; legs and abdominal prolegs salmon to reddish brown;
- in mature caterpillars, subventral band (near legs) primarily white with black spots; underside yellow.





Adult

- moth with chestnut brown forewings with very fine light grey markings grouped together at the centre and forming an irregular elongated marking;
- hindwings white with a small light grey dot in the centre and margins narrowly edged with brown;
- wingspan 30-35 mm.

Biology

- two generations a year in southern Quebec;
- overwinter as pupae;
- emergence of adults (1st generation) in the spring;
- eggs laid in masses on the foliage of various plants;
- caterpillars in June and July (1st generation);
- the caterpillars are defoliators;
- second-generation adults from mid-July to early September; caterpillars from late July to late September.

Hosts and symptoms

An extremely polyphagous and generalist species. Feeds on a wide variety of trees, shrubs and herbaceous plants, including several ornamental plants, garden plants, fruit and vegetable crops and field crops. The caterpillars feed on the leaves, leaving only veins. The plants then turn a brownish colour.

Bog Copper

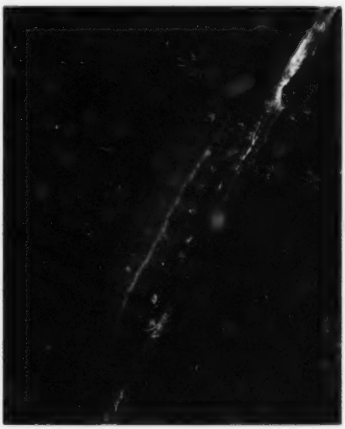
Cuivré des tourbières
Lycaena epixanthe (Boisduval & LeConte)
(Lepidoptera: Lycaenidae)

The Bog Copper occurs in eastern North America, west to Manitoba and south to Virginia. It is the only species of butterfly that uses cranberry as host plant.

Egg

- pure white initially, turning darker prior to hatching;
- flat sphere, surface with fine polygonal reticulation; diameter approximately 0.75 mm.

Caterpillar

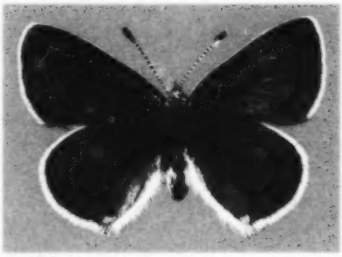


- green or blue-green with a faint white lateral line;
- body covered with a short dense velvety pilosity; looks somewhat like a velvet slug;
- legs very short and not very visible; head concealed;
- length 15 mm at maturity;
- the caterpillars do not move much and are difficult to notice;
- several other species of coppers and blues may be present but the Bog Copper is the only species to feed on cranberry.

Pupa

- green with black and purplish flecks; length 8-9 mm ;
- attached to a stem, exposed.

Adult



- small grey brown moth, wings fringed with white;
- in the male, upperside of wings with strong purply-blue reflections, several black spots and an orange spot at the tip of the hindwing;
- female dark brown without purple reflections or with very light reflections and rather large black dots;
- upperside of wings light grey with many black dots;
- wingspan 17-22 mm;
- antennae ringed with white and black with clubbed tips;
- at rest, the moths keep their wings in the vertical position above the body, thereby exposing the underside and blending with the vegetation.

Biology

- one generation a year;
- overwinter in the egg stage;
- after hatching, the young caterpillars feed under the old leaves;
- the more mature caterpillars feed on new shoots and terminal buds;
- pupation lasts 13 days under low leaves;
- the moths are active from the end of June to early August; they remain close to the cranberry bogs;
- eggs laid singly under the surface of cranberry leaves near the point of growth;
- the females can lay between 20 and 40 eggs each;
- the flight of the moths is slow and generally near the ground; the moths live in colonies.

Hosts and symptoms

Cranberry (*Vaccinium macrocarpon* and V. *oxycoccos*). Young caterpillars make holes in old leaves. More mature caterpillars also feed on terminal buds and young shoots.

Putnam's False Looper

Fausse-arpenteuse de Putnam
Plusia putnami Grote
(Lepidoptera: Noctuidae)

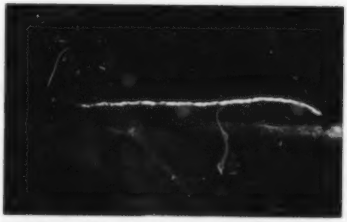
This species occurs from Newfoundland to Alaska, its range extending south to the Great Lakes region, the mountains of the western United States and northern California. It is also present in the Old World, from Siberia to Scandinavia, in Great Britain and in France.

Egg

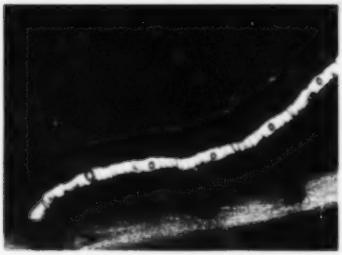
- white, dome-shaped;
- surface finely alveolate; diameter approximately 0.75 mm.

Caterpillar

- a false looper with 3 pairs of abdominal prolegs throughout its development;
- green with a white lateral band from the head to the last false leg;
- 4 very fine white lines, extremely faint, on the back; thorax green, without white lines;
- young caterpillar with long black sparse setae on the body; the setae are proportionally shorter in mature caterpillars;
- head light green with many small dark spots;
- young caterpillars may be confused with those of the False Armyworm and the Green Spanworm;



- spiracles white circled in green, all located in the centre of the lateral white band;
- length up to 32 mm at maturity.



Pupa

- light green, a large part of the back black;
- enclosed in a thin, delicate white silk cocoon woven on the plant; length 13-15 mm.

Adult

- forewings red with 2 silver or light gold drop-shaped marks in the centre, an elongated spot of similar coloration and edged with black near the tips and two yellow areas near the base and behind the silver spots;
- hindwings beige infuscated with grey;
- head and upperside of back orange or burnt orange, hairy;
- wingspan 27-32 mm.

Biology

- two generations a year;
- overwinter in the egg stage;
- caterpillars (1st generation) in May;
- only first-generation caterpillars have been found on cranberry;
- pupa in a silk cocoon attached to the plants;
- adults from mid-June to October, those of the two generations sometimes overlapping.

Hosts and symptoms

The caterpillar generally feeds on a variety of grasses. However, all caterpillars found in the cranberry fields were reared to the adult stage on cranberry plants, which they completely defoliated.

Gypsy Moth

Spongieuse
Lymantria dispar (Linné)
(Lepidoptera: Lymantriidae)

The Gypsy Moth originated in Europe and was introduced to North America in 1869 via Massachusetts. It is now found throughout northeastern United States and eastern Canada. Recent isolated infestations on the west coast of North America are attributable to a different subspecies that originated in eastern Siberia. Since 1970, the Gypsy Moth has become a major pest in Quebec. The female and eggs masses are often transported on vehicles (trailers, automobiles), which promotes rapid spread of the species.

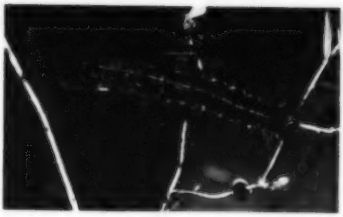
Egg

- approximately 1.5 mm in diameter, salmon pink, turning dark brown as they develop;
- laid in oval clusters measuring 15-40 mm x 10-25 mm covered with yellowish hairs from the abdomen of the female;
- the egg mass resembles a sponge or chamois.

Caterpillar

- body covered with long tufts of hair;
- back with 11 pairs of raised dots or tubercles bearing tufts of hair: in young caterpillars, all dots are blue;
- in intermediate and mature caterpillars, 5 pairs of blue tubercles on the anterior half and 6 pairs of red tubercles on the posterior half;

- young caterpillar has black back, turning grey;
- mature caterpillar speckled grey, light head with black flecks and spots;
- length at maturity approximately 60 mm.



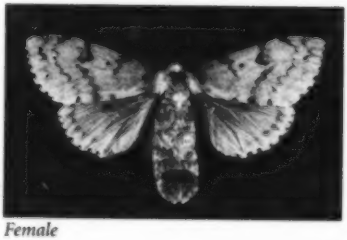
Pupa

- dark brown, enclosed in a cocoon covered with yellowish hairs, resembling a mummy;
- pupa of the male 15-20 mm in length; pupa of the female 15-36 mm.

Adult

- the adults exhibit pronounced sexual dimorphism;
- male with narrow body, antennae strongly pectinate, forewings brown with dark zigzag lines and an irregular dark area near the centre; hindwings brown with fine dark longitudinal lines;
- female with massive body and very swollen abdomen; antennae thin and very short; wings light beige, forewings with a black chevron marking and a black dot near the centre and fine dark zigzag lines, two of which are wider at the anterior margin; margin edged with black dots;
- the female is incapable of flight due to the weight of her eggs;
- wingspan approximately: 37-62 mm in the female, 37-50 mm in the male.

Male



Female

Biology

- one generation a year;
- overwinter in the egg stage;
- hatching from May to June and sometimes July;
- the young caterpillars migrate onto breaking buds and leaves;
- very light, they produce silk threads, which makes them easily transported by the wind;
- last-instar caterpillars are very voracious and can cause considerable damage;
- at maturity, the caterpillars enclose themselves in a silk cocoon, where the male will remain for approximately 13 days and the female for 10 days;
- the moths are present from mid-July to late August and sometimes later;
- the eggs are laid almost anywhere (trunks and branches of trees and shrubs, stones, etc.) in sponge-like masses containing on average 400 to 600 eggs.

Hosts

Polyphagous species attacking over 500 different plant species, primarily trees and shrubs. Its preferred species are oak, white birch, grey birch, larch, linden, willow, box elder, poplar, apple and speckled alder. In addition, beech, hemlock, pine and spruce become attractive to caterpillars that are halfway through their development.

Symptoms

The caterpillars can cause severe defoliation, particularly in young trees in sunny clearings. The Gypsy Moth can cause allergic skin and eye reactions in sensitive individuals.

Rear-humped Caterpillar

Ver-gris bossu
Amphipyra pyramidoides Guenée
(Lepidoptera: Noctuidae)

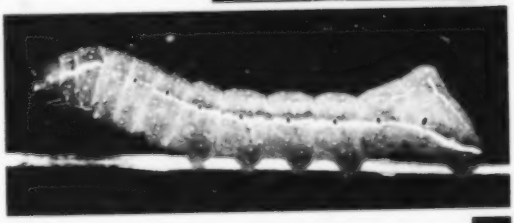
The adult of this cutworm is known by the name Copper Underwing due to the colour of its hindwings. The species is widespread throughout Canada and the United States.

Egg

- light yellow when first laid, turning purplish red after a few days;
- flattened, sphere-shaped somewhat resembling a sea urchin without spines; approximately 0.7 mm in diameter.

Caterpillar

- young caterpillar entirely yellowish green with five longitudinal white lines (one dorsal, two sublateral, two lateral) and several small scattered white dots;
- mature caterpillar apple green or light green (almost blue green), with small sparse yellow white dots; side with longitudinal yellow and white broken line at the level of the thorax; spiracles black; head apple green;
- end of abdomen with pyramid-shaped dorsal hump;
- length up to 40 mm at maturity.



Pupa

- dark brown, shiny, approximately 17 mm in length.

Adult

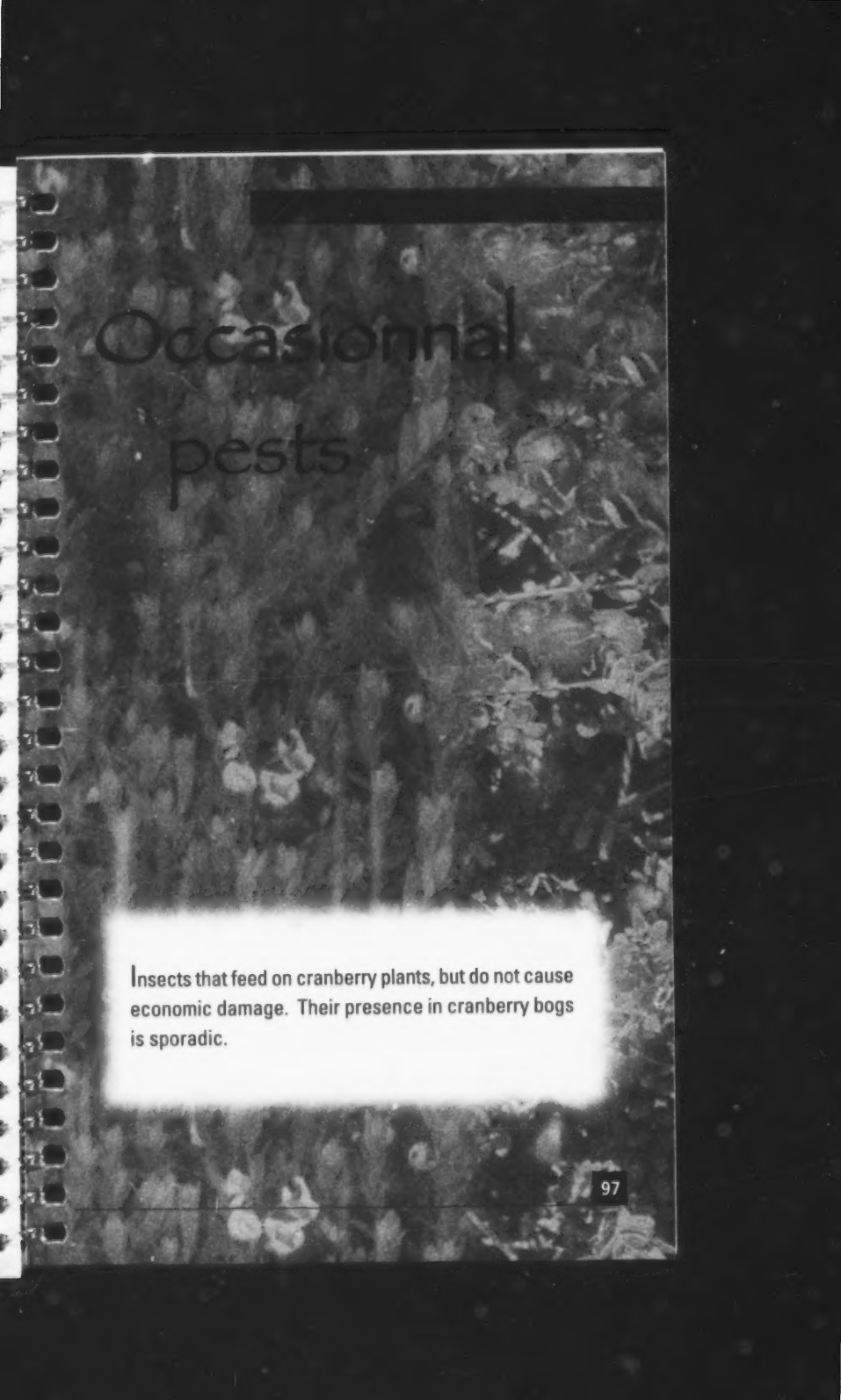
- forewings brown or grey brown, with several white or light grey markings and darker irregular spots; hindwings burnt orange with brown anterior section;
- wingspan 42-48 mm;
- the coloration of the hindwings distinguishes this species from all other noctuid moths.

Biology

- one generation a year;
- overwinter in the egg stage;
- caterpillars from late April or early May until June;
- the caterpillars feed on foliage until they reach maturity;
- pupa in the soil in a cocoon made of silk and plant debris;
- adults from mid-July to late September;
- one female can lay 275 eggs on average;
- eggs laid singly or in small clusters, in September.

Hosts

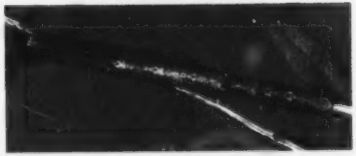
Polyphagous species. Feeds on a variety of trees and shrubs, including blueberry, grape, apple.



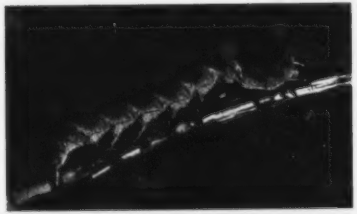
Occasional pests

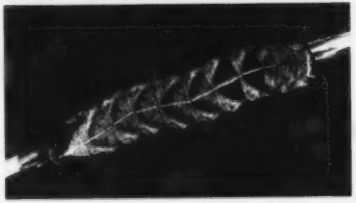
Insects that feed on cranberry plants, but do not cause economic damage. Their presence in cranberry bogs is sporadic.

Name	Description of larva	Period of larval activity	Host plants
Johnson Spanworm Arpenteuse de Johnson *Euchlaena johnsonaria*(Fitch) (Lepidoptera: Geometridae)	grey, back with 6 red squarish marks and 2 small humps, one in the anterior quarter and the other just in front of the first abdominal prolegs	May and early June	on various trees and shrubs; occasionally on cranberry
Fringed Looper Arpenteuse perlée *Lampaea perlata* (Guenée) (Lepidoptera: Geometridae)	grey-brown, sometimes with reddish tint; a looper with 3 pairs of abdominal prolegs, the first of which is small; ventral margin fringed with dense, short hairs	May (1st) July (2nd)	polyphagous on trees and shrubs
Chevron-marked Caterpillar Chenille à chevron *Melanchra adjuncta*(Guenée) (Lepidoptera: Noctuidae)	red brown with 3 pairs of large purplish crescent-shaped marks on the back, two towards the front and one in the rear with a hump; spiracles white; caterpillar very distinct	June and July (1st) August to October (2nd)	polyphagous
Whitemarked Tussock Moth Chenille à houppes blanches *Orgyia leucostigma*(J.E. Smith) (Lepidoptera: Lymantriidae)	similar to Rusty Tussock Moth but without lateral black brushes and with few red warts; the colour of the tussocks and body varies	mid-July to September	polyphagous on deciduous and coniferous trees

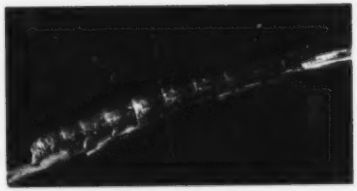


Johnson Spanworm

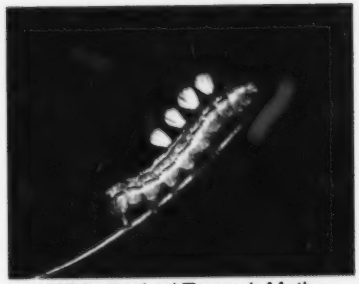




Chevron-marked Caterpillar



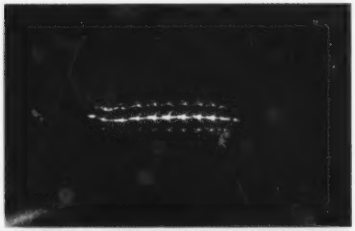
Fringed Looper

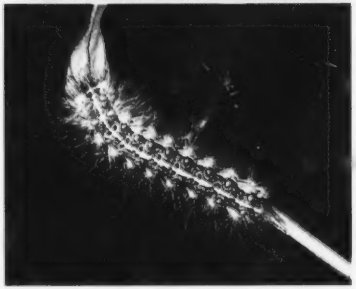


Whitemarked Tussock Moth

Occasional pests — Larvae

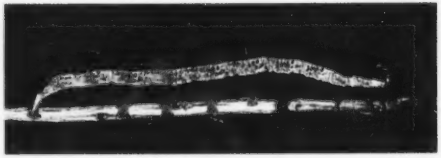
Name	Description of larva	Period of larval activity	Host plants
Fall Webworm Chenille à tente estivale *Hyphantria cunea*(Drury) (Lepidoptera: Arctiidae)	caterpillar very hairy, silky white hairs, body with extremely variable coloration; back with a median light band; hairs protruding from yellowish "warts"	late July to mid-September	polyphagous on a wide variety of deciduous trees
Saltmarsh Caterpillar Chenille des marais salés *Estigmene acrea*(Drury) (Lepidoptera: Arctiidae)	caterpillar densely haired, dark body, coloration of hairs variable from white to red to black; "warts" reddish or black	June to August	polyphagous on a wide variety of plants
Cranberry Sawfly Mouche à scie des atocas *Pristiphora cincta*Newman (Hymenoptera: Tenthredinidae)	6 pairs of abdominal prolegs; body greenish yellow to reddish, head brown; the colour can vary but the larva is generally without markings	late August to mid-September	cranberry, blueberry (*Vaccinium* spp.)
Subdued Quaker Orthosie gris-vert *Orthosia revicta*(Morrison) (Lepidoptera: Noctuidae)	caterpillar very similar to the Cranberry Blossomworm; 6 black spiracles located in the centre on the lateral white band; head with two dark bands (sometimes indistinct)	May and June	polyphagous
Graceful Clearwing Sphinx gracieux *Hemaris gracilis*(Grote & Robinson) (Lepidoptera: Sphingidae)	caterpillar green with light yellow longitudinal line on the back, and a bright red spine-shaped point at the end; spiracles red with black edge; underside and false legs black; legs red; very distinctive	June and July	cranberry, laurel; generally rare





Fall Webworm

Cranberry Sawfly



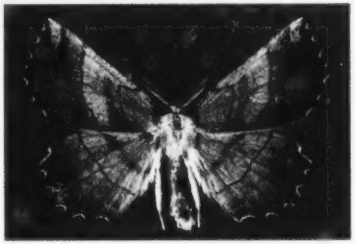
Subdued Quaker

Saltmarsh Caterpillar

Graceful Clearwing

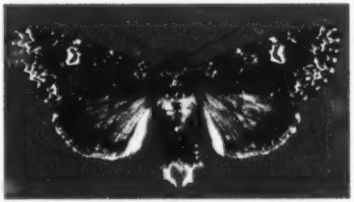
Occasional pests — Adults

Name	Description of adult	Flight period	Generations / year	Overwintering
Johnson Spanworm Arpenteuse de Johnson *Euchlaena johnsonaria*(Fitch) (Lepidoptera: Geometridae)	wings reddish brown with scalloped margins, 2 wavy transverse brown lines; forewings with two black marks near the margin; wingspan 32-43 mm	June and July	1	egg
Fringed Looper Arpenteuse perlée *Campaea perlata* (Guenée) (Lepidoptera: Geometridae)	body and wings white, with very light green tinge; forewings with 2 oblique greenish bands edged with white; hindwings with a similar band; wingspan 23-45 mm	June to mid-July (1st) August and September (2nd)	2	semi-developed caterpillar
Chevron-marked Caterpillar Chenille à chevrons *Melanchra adjuncta*(Guenée) (Lepidoptera: Noctuidae)	forewings blackish with white marbling and a reniform mark two-thirds down the wing; can superficially resemble the Impressed Dagger Moth, among others	May and June (1st) July to September (2nd)	2	pupa
Whitemarked Tussock Moth Chenille à houppes blanches *Orgyia leucostigma*(J.E. Smith) (Lepidoptera: Lymantriidae)	male: same form as that of Rusty Tussock Moth but ash grey with blackish zigzag bands; wingspan 30-35 mm; female wingless, similar to the female Rusty Tussock Moth	July to September	1 (sometimes 2)	egg or young caterpillar

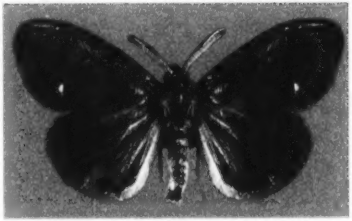


Johnson Spanworm

Fringed Looper



Chevron-marked Caterpillar



Whitemarked Tussock Moth

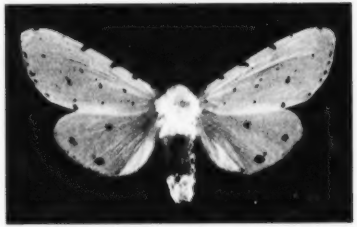
Occasional pests — Adults

Name	Description of adult	Flight period	Generations / year	Overwintering
Fall Webworm Chenille à tente estivale *Hyphantria cunea*(Drury) (Lepidoptera: Arctiidae)	moth entirely white, wings immaculate; wingspan 25 mm	late May to early August	1	pupa
Saltmarsh Caterpillar Chenille des marais salés *Estigmene acrea*(Drury) (Lepidoptera: Arctiidae)	moth white; wings with scattered small black dots and spots; abdomen yellow; hindwings and underside ochre yellow in male, white in female; wingspan 40-50 mm	mid-June to early September	1 (sometimes 2)	pupa
Cranberry Sawfly Mouche à scie des atocas *Pristiphora cincta*Newman (Hymenoptera: Tenthredinidae)	resembles a small black wasp with yellow legs and abdomen (except for end of upper surface); wings transparent with clearly visible veins	mid-August to mid-September	1	mature larva in a cocoon in the soil
Subdued Quaker Orthosie gris-vert *Orthosia revicta*(Morrison) (Lepidoptera: Noctuidae)	moth with forewings with wavy dark brown transverse line near the margin; an ill-defined faint median transverse brown band and short red lines, two of which circle a rounded ill-defined mark	April to May	1	adult in cocoon
Graceful Clearwing Sphinx gracieux *Hemaris gracilis*(Grote & Robinson) (Lepidoptera: Sphingidae)	moth with greenish body; wings with purple margins and transparent centre; 35-40 mm; diurnal, very rapid and noisy flight, very closely resembles a bumblebee, forages flowers by hovering in place	May to September	1	pupa

Occasional pests — Adults

Fall Webworm

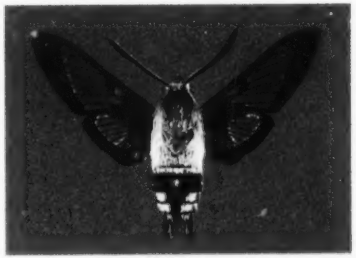
Saltmarsh Caterpillar — male



Saltmarsh Caterpillar — female

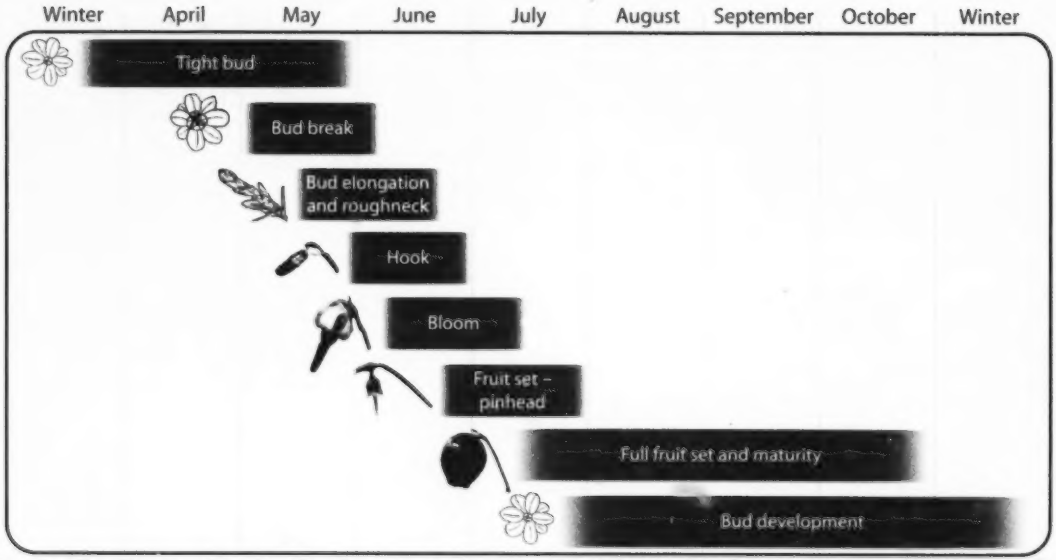
Cranberry Sawfly

Subdued Quaker

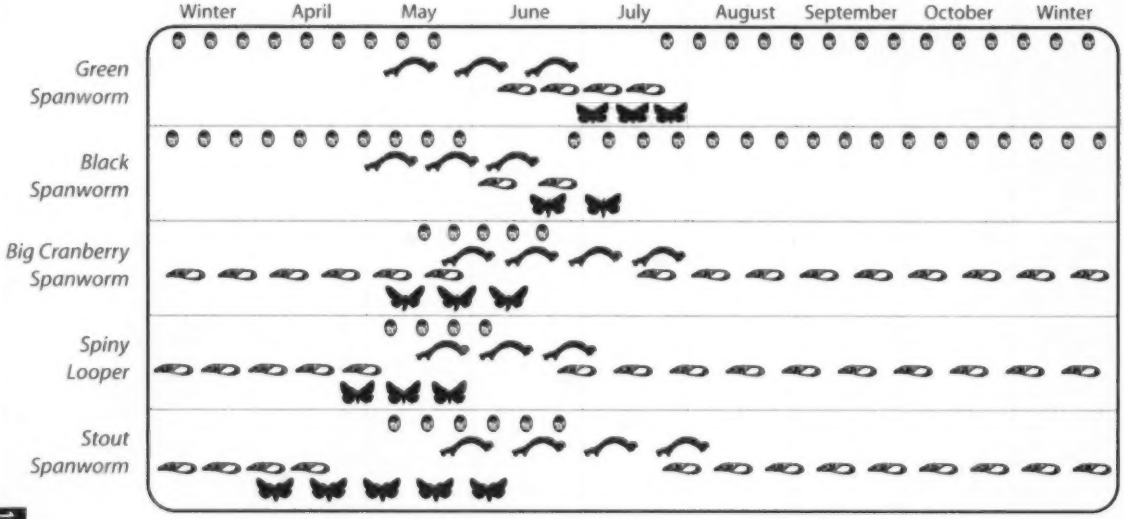


Graceful Clearwing

Cranberry plant life cycle in the Bois-Francs Region, Quebec

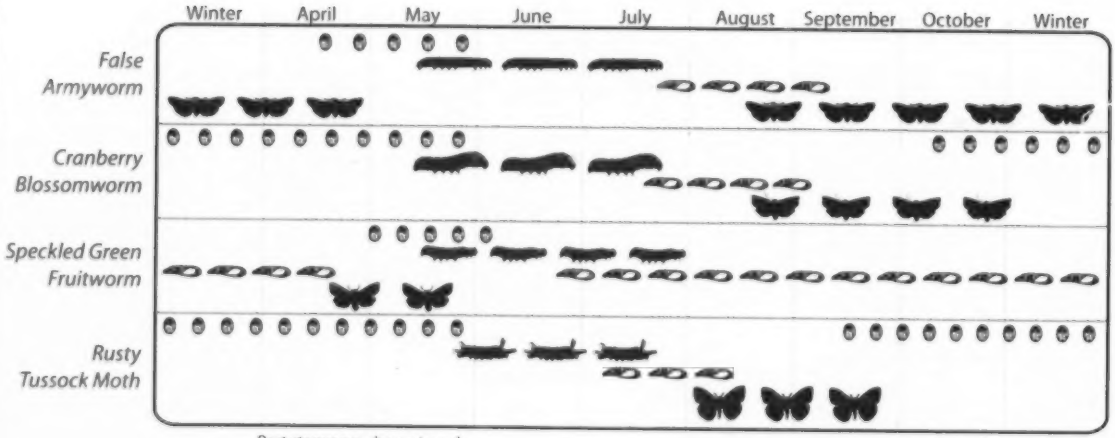


Life cycles of some spanworms and loopers in cranberry fields in Quebec



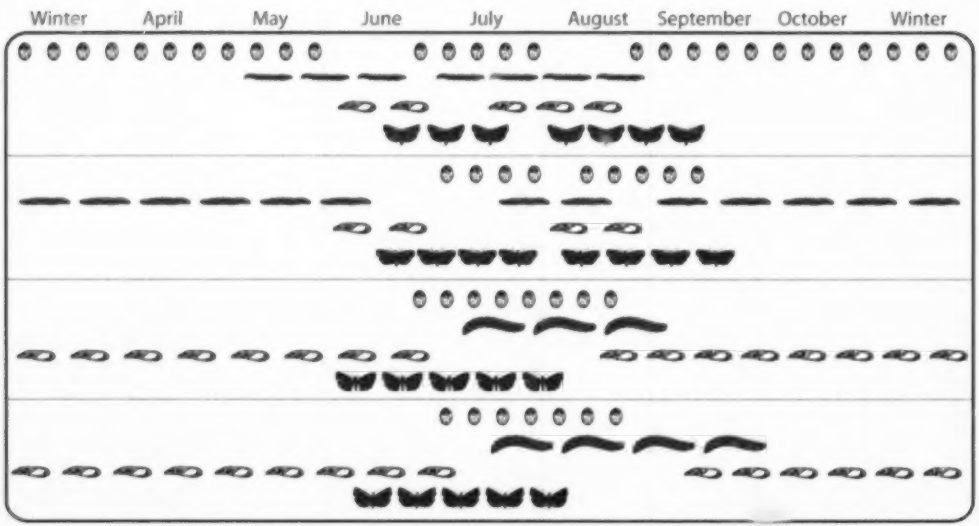
Pest stages are shown in red.

Life cycles of some cutworms and tussock moths in cranberry fields in Quebec



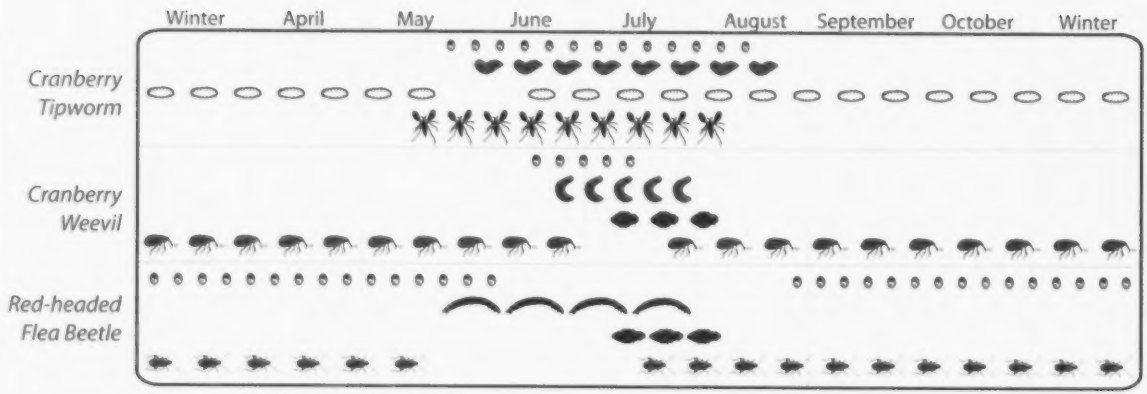
Pest stages are shown in red.

Life cycles of tortricids and pyralids in cranberry fields in Quebec



Pest stages are shown in red.

Life cycles of the cranberry tipworm and beetles in cranberry fields in Quebec



Pest stages are shown in red.

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Glossary

Abdomen: posterior, and often the longest, part of an insect's body; bears the abdominal prolegs when present.
Apex: end or tip; frequently used term in entomology.
Apical: of, relating to, or situated at an apex.
Calyx: the outer part of a flower, consisting of sepals.
Caterpillar: larva of Lepidoptera (moths and butterflies) recognizable by the presence of abdominal prolegs (2-5 pairs) and a spinneret; the spinneret is located near the mouth and secretes silk.
Filiform: thin and long like a thread.
Fruit set: transformation of the ovary of the flower into fruit.
Larva: immature, non-reproductive form of holometabolous insects (insects that have complete metamorphosis), between the egg and pupa; essentially the feeding and growth form; the larva undergoes several stages of development separated by moults.
Pectinate: shaped like a comb.
Peduncle: stalk supporting the flower.
Proleg: non-jointed leg resembling a suction cup and located under the abdomen; found in the larvae of certain groups of insects (primarily in caterpillars), in varying numbers and positions depending on the group: no more than 5 pairs in caterpillars (Lepidoptera), but at least 6 pairs in sawflies (Hymenoptera).
Pupa: transformation stage between larva and adult in insects having complete metamorphosis (i.e., passing through egg, larva, pupa and adult stages); in many insects, the pupa is enclosed in a protective cocoon formed by the larva on completion of its development.
Reniform: having the shape or outline of a kidney; often describes a spot having this shape present on the forewings of many noctuid moths.
Sexual dimorphism: condition of having the two sexes of a species markedly dissimilar in appearance.
Spiracle: breathing aperture in an insect; in caterpillars, there are 9 pairs of spiracles, one on the thorax and 8 on the abdominal segments; they generally resemble oval dots of variable size and colour.
Thorax: intermediate part of an insect's body, located between the head and the abdomen; bears legs and, in the adult, wings.
Thoracic shield: dorsal shield of the thorax, located just behind the head and often a different colour from the rest of the thorax; present in some caterpillars, such as leafrollers and fruitworms.
True leg: jointed leg located under the thorax with a claw at the end; when present in insects, there are 3 pairs.

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This guide for the identification of cranberry pests of Quebec is intended to serve as an essential diagnostic tool to assist producers and plant health protection authorities in the application of integrated pest management programs.

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